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ABSTRACT

This book describes ways to help teachers teach using technology and project-based instruction. It opens with a theoretical 3-year school-improvement plan that outlines a framework for developing curricula that address real-world applications. The second chapter describes how schools can write a sound technology plan of action, which includes technology goals and a 3-year staff-development schedule. Chapter 3 provides a model for aligning integrated units with real-world projects and includes examples of how teachers weave technology throughout the learning process to give students the skills that they will need as they enter the work force. The fourth chapter discusses the structuring of project-based environments using technology and the allocation of time for instructional seminars, conferences, and projects. Classroom-management ideas for multiple-computer and one-computer classrooms are covered, and goals for integrating projects and curriculum are outlined for each of the 3 years of restructuring. The last chapter discusses a wide range of assessments to evaluate both the processes and results of student learning. Components of school restructure are integrated into assessment and performance tasks are aligned to multiple intelligences. The text advocates the use of multiple assessments to give parents a holistic picture of their children's learning. Three appendices offer templates and further information. (Contains an index and 41 references.) (RJM)

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DESIGN TEAMS for School Change

A CYBERPROJECTS APPROACH

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FOREWORD BY SANDRA MARKLE

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DESIGN TEAMS
FOR
SCHOOL CHANGE

A Cyberprojects Approach

Linda Ash
Jim Luckey
John Avis

SkyLight
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Design Teams for School Change: A Cyberprojects Approach

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Foreword

Computer technology and access to the Internet have permeated all aspects of today's society. Increasingly, technology education is a basic requirement to even the lowest-level jobs.

At a recent Net Day rally to wire schools for Internet access, Vice President Al Gore expressed concern about the "digital divide" and announced new initiatives to provide Internet access for every child. According to the National Center for Education Statistics, "every child" currently means more than 30 million students in U. S. public and private schools. That's a lot of students, but the Federal government is helping schools reach their technology goals with an overall increase in education funding of 584 percent in just four years. Specific support for technology education includes Goals 2000 grants, Star Schools, and Local, Urban, and Rural Systemic initiatives. Perhaps even more impressive is that federal funding represents only about 6 percent of the total support for technology education. State and local school districts are each sharing 43 percent of the effort—fueled by the desire of parents and even corporations to prepare children for the future workforce.

Added to the availability of funds and a desire to provide technology education is dropping computer prices, enabling computers and Internet access to go beyond merely penetrating schools to moving right into the classrooms. This is creating two critical needs: the need to prepare the more than two million teachers who are largely unfamiliar with how to use this new instructional tool and the need for a quality plan for implementing the integration of technology into the core curriculum of reading, writing, mathematics, science, and social studies. *Design Teams for School Change: A Cyberprojects Approach,* by Linda Ash, Jim Luckey, and John Avis makes a valuable contribution to solving both problems. Chapter by chapter, this resource presents strategies for how districts, schools, or even individual teachers can develop a strong technology education plan. Then it provides step-by-step guidance for implementing that plan. The authors base the examples on real-world projects and their own school's model. What makes the action points identified in *Design Teams for School Change: A Cyberprojects Approach* especially valuable is that they've been tested and proven to really work.

While reading this book, I was reminded of the story of how Squanto helped the Pilgrims succeed in the New World. He showed them how to raise crops they knew nothing about and showed them how to tap maple trees for the sweet sap, a valuable resource that had been unavailable until he showed them how to access it. Linda Ash, Jim Luckey, and John Avis are the guides for school administrators and teachers in the new technology education world. What they share in *Design Teams for School Change: A Cyberprojects Approach* helps ensure that students learn the skills they need to enjoy a successful future.

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Introduction

Design Teams for School Change: A Cyberprojects Approach provides a blueprint for leading educators and school communities into the twenty-first century. The information age is forcing schools and educators to examine their curriculum, to look at how they are using technology, and to change the way they assess students' progress. The demands placed on future workers require educators to increase students' abilities in reading, writing, speaking, and listening. In addition, teachers need to make sure their students know how to use a computer, access information, problem solve, process interpersonal and lifelong learning skills, set goals, and function as team members.

Many schools integrate forms of technology into classrooms across the nation without much guidance to help teachers use these tools. Technology can include laser disk players, camcorders, calculators, computers, scanners, and many different software applications. Administrators and teachers can use this book as a resource as they redesign the way they deliver instruction, integrate technological skills, and utilize multiple assessment strategies.

The first chapter, Redesigning Schools to Increase Learning, explains a theoretical three-year school improvement plan (SIP). The SIP outlines a framework for developing curriculum that addresses real-world applications. Restructure efforts include an integrated, standards-based curriculum, project-based instruction, and the integration of technology and performance assessment. Designers must work backward and start with the big picture instead of beginning with an isolated lesson plan. This approach to curriculum and instruction helps create connections for students. Isolated lesson plans lack flow between concepts—students may understand what is taught in the lesson, but they cannot connect the information together to apply it to new situations. Many students cannot relate what they learn in school to what is expected on the job. Students often ask "Why do I need to know this?" The step-by-step process is discussed for initiating whole-school restructuring to integrate technology.

The second chapter, Building a Strong Technology Program to Support Learning, describes how schools can write a sound technology plan of action. Technology goals and a three-year staff development schedule are included, as well as plans for monitoring technology integration and staff development implementation. Several Web sites appear throughout the text in brackets (< >). Do not type in the brackets when typing in the address.

Chapter 3, Designing Projects for Real-World Learning, ensures the curriculum is taught by providing a model for aligning integrated units with real-world projects. Strategies are explained to show how teachers weave technology throughout the learning to give students the skills they will need as they enter the work force in the next century. Examples of elementary, middle, and high school projects are shown where essential understandings in an integrated unit are linked to performance tasks in a project template, integrating technology throughout all subject areas to assure scope and sequence.

Chapter 4, Implementing Projects for Real-World Learning, discusses structuring a project-based environment using technology, allocating time for instructional seminars, conferences, and projects. Classroom management is covered for the one-computer classroom as well as one with multiple computers. The goals and staff development for integrating projects and curriculum are outlined for each of the three years of restructure. The variation in activities, discussions, and student interaction is also discussed.

Chapter 5, Assessing Technologically Sound Projects, demonstrates a wide range of assessments to evaluate both the processes and results of student learning. The components of school restructure are integrated into assessment. Performance tasks are aligned to multiple intelligences. Observations, portfolios, report card inserts, narrative reports, and performance assessments must be used together to give parents a holistic picture of their children's learning.

As design teams plan to restructure the learning environment, teachers and administrators can use the three sample units in the appendixes as references. Teachers can easily adjust the units to fit any K–12 classroom. They can also use the included glossary to become familiar with new terminology.

The authors provide examples from their own experiences with the three-year SIP. Many of the examples are drawn from their own experienced at Oak Forest School in Memphis, Tennessee. This book is based on a framework they developed to help teachers improve student learning using technology and project-based instruction. This framework shows readers how to think about curriculum; develop a technology plan; and design, implement, and assess project work.

Pre- and in-service educators, staff developers, and university professors can use the book as a reference when designing schoolwide restructure courses. Superintendents can use it to guide their district restructure efforts. Principals can use this book as they put together their school improvement plans for implementing restructure, project-based instruction, and the integration of technology.

Teachers can use this resource in a one-computer classroom as well as with multiple computers or in a lab setting. They can use it, especially chapters three and four, to learn how to incorporate standards, projects, technology, and performance assessment into the daily life of their classroom to ensure real understanding is taking place. This results in students who are more likely to become engaged, independent, critical thinkers when their learning is viewed as an opportunity for significant investigations, individual applications, and personal reflection. Classrooms are places where students talk, read, write, and compute frequently—places where they learn better and learning lasts longer.

Chapter 1

Redesigning Schools to Increase Learning

A planned program of standards-based instruction is at the heart of restructuring the way teachers support and create exemplary practices that lead to students' understanding and application of content and knowledge. Teachers need to rethink their practices of delivering instruction to meet the challenges of an ever changing society.

Such restructuring efforts require coupling best instructional practices with the integration of technology, allowing students to apply what they learn through authentic project-based work and performance tasks. Projects help students extend and apply what they have learned, decreasing the gap between school and the real world. An authentic, interdisciplinary project-based instructional focus increases mastery of basic skills, builds a strong relationship between school and the workplace, and provides the ability to apply knowledge in meaningful ways. The goal of such restructuring is to enable students to make connections between what they are doing in the classroom and the demands and expectations found in the world of work.

To effectively integrate technology into the classroom, educators first need to develop a standards-based curriculum. Paralleling this strategy with industries' philosophies to meet or exceed a prescribed level of performance has changed the way educators must design and deliver curriculum and instruction. Instead of simply assigning a letter grade on a piece of work, teachers can give students specific criteria beforehand, so they know the level of performance expected of them. When teachers begin designing and choosing instructional activities, they should first examine what standards they need to address in the core curricular areas and recognize what essential understandings, what big ideas students need to gain from a course of study, and what standards will lead students to those critical understandings. Then teachers need to design and select those activities that meet or exceed the standard. Educators must start with the content standards to ensure that a standards-driven curriculum is in place and not a curriculum that plugs standards in here and there.

The School Improvement Plan

The school improvement plan (SIP) is a plan of action to achieve whole-school change. It outlines how educators can implement a standards-based curriculum, project-based teaching, and the integration of technology and performance assessment. Teachers and administrators work together to establish schoolwide goals in each subject area as well as goals for school safety, parental involvement, attendance, and technology.

Define a Vision Statement

Once the decision is made to integrate projects and technology into a standards-based curriculum, administrators and teachers can begin with a vision statement outlining goals. All strategies, curriculum, and instruction point toward achieving the goals set in the vision. Roland Barth (1990 and 1995) believes administrators and teachers must take time for personal reflection and must make thoughts available for inspection by putting them on paper and formulating a vision of what their schools need to look like and what they want their schools to accomplish.

Such a vision statement needs to establish the formation of multigrade or integrated teacher teams at the beginning of the first year of restructure. It is easier for teachers to integrate across the curriculum and make connections between the disciplines when they work as a team.

Create Teacher Teams and a Design Team

After establishing a vision statement, the next step is to form teacher teams and a design team at the beginning of the school year. Teamwork is an important element in today's workforce. Teachers can draw from each other's strengths when working and planning in teams. Teachers wear many hats during the school day, becoming experts in certain areas and sharing some of the planning produces for higher quality instruction. Students are often asked to work in cooperative groups. The best way to convey this instructional strategy is to model it.

Teams of three to five teachers usually work best. This is a manageable number to distribute the planning tasks but not too large to limit creativity or activity planning. A forty teacher faculty may have eight to thirteen teacher teams. Each teacher has a particular role within the team such as leader (the team leader is also a member of the design team), public relations contact, technology expert, and recorder of minutes. Depending on the number of teachers on a team, these roles may vary. Members may need to share tasks if fewer members are in teams. Certain projects may even require special tasks that require an additional role. Flexibility and the willingness of members to do what is necessary to get the job done make the team function smoothly.

Team leaders from teacher teams, administrators, support teachers, and curriculum coordinators make up the design team, which is responsible for translating the school's vision into the SIP. The team leaders report back all information to the teachers on their planning teams. Once the design team establishes benchmarks for the year in different areas specified in the SIP, the leaders report to the teacher teams so they can plan project tasks to reach the benchmarks.

The support teachers are an essential element of the design team. They teach classes such as computer or science lab, music, art, or resource. Since support teachers extend project work from the classroom into the disciplines, they play a key role in an integrated learning environment.

Develop a Three-Year Structure

Change does not happen overnight. Three years appears to be the approximate amount of time to allow teachers to implement these changes in segments to avoid being overwhelmed. There is nothing magical about three years. Some schools may need up to five years. A SIP that covers a three-year period provides a transition that is carefully planned, clearly organized, and relatively smooth.

As design teams begin writing SIPs, they need to determine desired outcomes, whether it be a specific increase in literacy, standardized test scores, attendance percentages, or parental involvement. Setting yearly benchmarks makes these goals and tasks easier and more realistic to accomplish. After reviewing all the data, the design team can identify each area needing improvement and then write the goal, the benchmark for the year, and strategies they want to implement to reach the benchmark.

During the first year, the design team writes a SIP including the technology goals with specific benchmarks focusing on achieving goals in the vision statement. The SIP covers points such as governance, pedagogy, curriculum, assessment, professional development, and technology. The design team then needs to to develop a time line for reaching benchmarks in each subject area. Yearly benchmarks set at the beginning of each year optimize growth. Teacher teams can then focus on action plans for reading, social studies, mathematics, science, language arts, promotion, attendance, dropout rate, safety, and parental involvement.

Each school must look at what areas need improvement and address these areas in the SIP. The design team needs to outline the state and district goals and describe major strategies teachers can use in each area to achieve these goals. Teacher teams design specific tasks or activities to reach the benchmark when planning project work. In many cases, it is helpful to identify a monitor who is responsible for implementation. A monitor can be a curriculum coordinator who can frequently attend team planning meetings and report the progress of project work to the administration.

The design team identifies up front where the school should be in three years. As the three-year plan unfolds, the design team can adjust the SIP as the school restructures.

A New Process for Developing Curriculum

As administrators and teachers restructure their school's learning environment, as outlined in the goals set in the SIP, a new process for designing curriculum helps students understand the big idea and make connections across the curriculum. Teachers who begin planning an individual lesson lose focus of how all activities fit into a big picture. Activities become fragmented, and students do not gain deeper understandings that can transfer to new situations. Instead, teacher teams begin project planning by formulating key questions and developing key concepts they want students to know upon completion of the project. They start with the big idea to determine what standards they need to address and design tasks that lead toward answering the big idea questions.

Local building administrators, including principal, vice principal, or curriculum coordinator, must create and provide staff development to show how to follow a new planning process when developing projects (see Figure 1.1). Keep in mind this is a theoretical framework. The order of these steps may change according to a district's direction or school's needs.

Working Backward

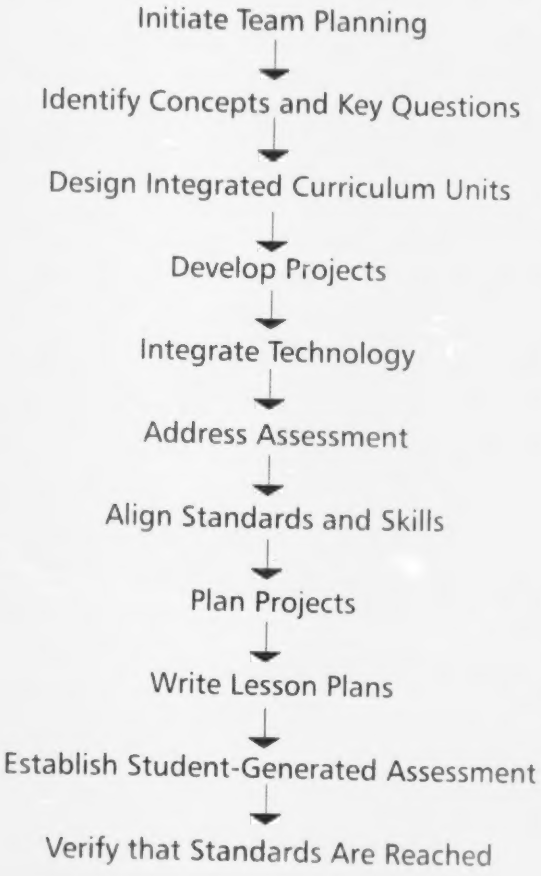
Initiate Team Planning
Identify Concepts and Key Questions
Design Integrated Curriculum Units
Develop Projects
Integrate Technology
Address Assessment
Align Standards and Skills
Plan Projects
Write Lesson Plans
Establish Student-Generated Assessment
Verify that Standards Are Reached

Figure 1.1

This new planning process forces teachers to start with the big ideas and look past a fact-based, thematic unit. For students to make connections, they need to look through a broad conceptual lens at things such as change, interdependence, relationships, and behaviors. This is necessary if students are going to transfer their knowledge to new situations (Erickson 1995).

Instead of designing a project for students to learn facts about an animal, teachers develop activities that point toward how animals and humans are interdependent within the environment. As students work toward answering a question on animal and human interdependence, they learn facts about the animal and acquire a deeper understanding about the concept of interdependence that can be transferred to different situations.

Technology is the tool to achieve these understandings. Teachers need to view the use of technology as a natural extension of the lesson. For students, using technology should be as natural as picking up a pencil and paper when writing a report. All students should be able to participate, even when individual differences exist. Students should be able to explain how they are using technology to extend learning or create a product. If they can do this in one or two sentences, then technology is being effectively used to enhance student learning.

Initiate Team Planning and Identify Concepts and Key Questions

Faculty meetings and inservice times are now changed into team planning and staff development sessions for teacher teams. This change needs to occur during the first year of restructure in the SIP. Teachers begin working in teams to formulate key focus questions or driving questions for students to answer in project work. Brainstorming takes place at the beginning of these sessions. Questions are broad but not vague. These questions are the foundation of a "thinking" curriculum and help students develop strong intellectual habits. These guiding questions, used later to shape a unit of study in the project, are meant both to intrigue and focus students on the important tasks at hand. Found on the Instructional Technology Teacher's Home Page under "Steps in Building a Unit of Study" <www.servtech.com/~germaine/steps.html> Grant Wiggins provides a checklist for a driving question (see Figure 1.2). (Also see Wiggins and McTighe 1998.)

Checklist for a Driving Question

1. Does it go to the heart of the matter?
2. Can the question be addressed in many subjects?
3. Does it promote thoughtful habits in mind?
4. Is the question too broad or too narrow?
5. Does it generate a personalized interest?
6. Does it lend itself to real-world applications?

Figure 1.2

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Design Interdisciplinary Curriculum Units

At this point in the development process, teacher teams have decided on many of the elements in the project. Now teams need to tie them together through the design of integrated units of study.

According to the Center for Leadership in School Reform (CLSR), recent calls for educational restructure focus on the need for curricula emphasizing higher level learning that produces quality student work all through the curriculum. Basic to this effort is the belief that educational experiences are more authentic and of greater value to students when curricula reflect real life, which is multifaceted, rather than being compartmentalized into neat subject-matter packages. Integrated instruction capitalizes on natural and logical connections that cut across content areas and is organized around driving questions, themes, problems, and projects rather than around subject matter. Such instruction is more responsive to students' curiosities and questions about real life and results in productive learning and positive attitudes toward school and teachers. An integrated curriculum designed for project work needs to maintain the integrity of content drawn from the disciplines. Projects must use meaningful connections to sustain student inquiry among disciplines.

An instructional unit can range from a few days of concentrated study to an entire school year. Quite simply, a unit is an organized block of instruction. Whether the unit is long term or short term, teacher teams must carefully construct it to provide continuity while avoiding the semblance of a series of loosely related activities.

When creating a unit for a project, teacher teams must make a careful assessment of students' needs and interests as well as review district goals and related content standards. At the same time, a good instructional unit is consistent with teachers' philosophies of instruction and discipline. Units need to reflect the notion that the content is worth knowing while giving consideration to how students learn.

Perhaps the most functional arrangement of a unit of study in the project is the thematic or topical unit. There are three advantages to using this particular arrangement:

1. A thematic unit accommodates a wide range of literacy and other linguistic material.
2. A thematic unit is naturally interdisciplinary.
3. Thematic units allow a natural integration of literature and language arts (reading, writing, listening, speaking) with other disciplines of study.

There is an obvious need to teach for deeper understanding. Teachers can do this with the facts and skills embedded into the unit content. Students need to see content in relation to their world, and they need to think critically.

Teachers need to teach to the big idea (the deep understanding) rather than just presenting and stringing topics together (Erickson 1995). Such teaching has its foundation on *facts* upon which are built *topics* that lead to the development of *concepts*. The concept serves as the eye for studying the topic. It pulls the topic to a higher level of integration of disciplines. These higher levels of thinking make connections of knowledge. When planning, it is helpful to ask

- What concept would help to understand and view this topic?
- What higher order questioning strategies could be used to lead to higher order thinking skills?

This guides students toward essential understanding of the facts, skills, and concepts found in the content of the project, in essence, the big idea. Teachers must remember, unit design is a writing and thinking process—a messy process that needs revisiting, revising, and improving.

Develop Projects

To ensure the curriculum is covered in the project, teacher teams must consider essential knowledge and skills that students need to possess. As the planning process begins, team leaders from each teacher team must pose the following questions during their first brainstorming session:

- What standards (national, state, or district) must be addressed and assessed through this project?
- What level of performance is defined as acceptable when evaluating students'mastery of content?
- What type of culminating products should students produce?
- How will products and performances be measured?

Now teacher teams write down ideas. It works well to use large paper and markers to brainstorm and write down what comes to mind. Teams can cut and paste ideas as needed. As ideas begin to emerge, plans start to outline benchmarks, tasks, products, and performances that will later form the infrastructure of the project.

Integrate Technology

At this point, teams need to examine how they can effectively integrate technology into projects. One primary goal of schools is that every student be competent in the use of current technology. Students need to learn the value of making use of technology as a necessary and important tool for their learning. It intrinsically promotes active learning and it is this mode that puts students into situations that require them to read, speak, listen, think, and write at higher levels of comprehension.

Ideally, classrooms should be equipped with at least one to four computers that have Internet and e-mail access. All computers should be connected to a local area network (LAN) or a wide area network (WAN). Other multimedia equipment that students can use in project work includes electronic blackboards, laser disc players, QuickTake cameras, camcorders, LCD projectors, scanners, a closed circuit microscope video system, and laptops.

It does not matter how technology is distributed throughout the school; teachers can design tasks to fit their technology situation. If teachers have one or several computers in their classroom, activities can be managed in a "center" format where multiple tasks are occurring at the same time and students rotate between the tasks, or centers. Hands-on labs allow more students to use computers at the same time. The same goals to integrate technology as a seamless component throughout learning can be achieved regardless of where the computers are located or how many are available. The difference occurs in the way teachers design tasks and in the length of time teachers allow students to complete tasks.

Technology in the classroom should not follow a drill and practice philosophy. Teachers need to use it as a means to challenge, support, and extend students' learning. Technology expands exponentially the learning opportunities in a way that parallels the tutorial method of instruction, which provides an individual teacher for each student. Students demonstrate technological expertise through online research and multimedia presentations that extend their classroom project work.

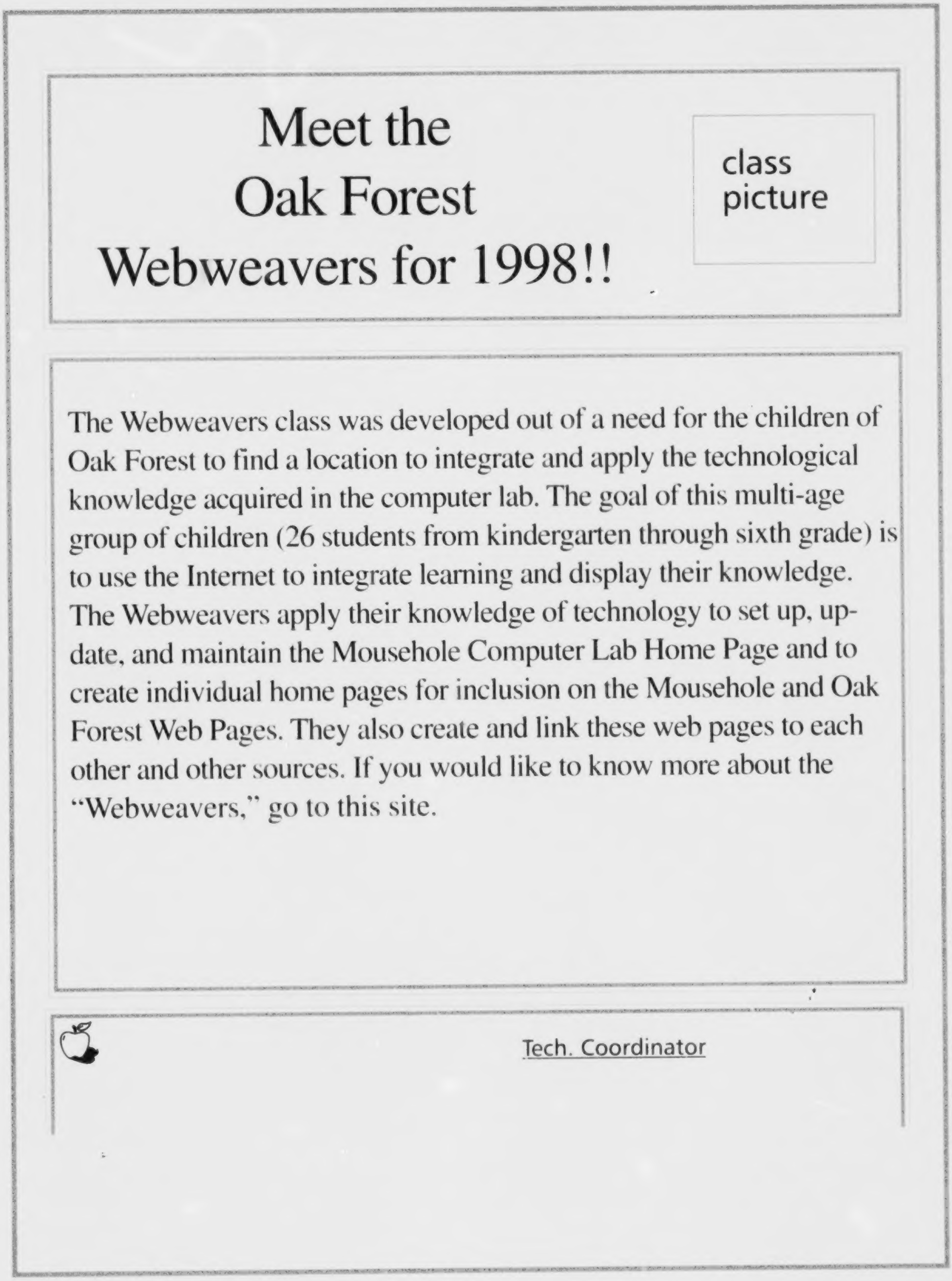
Schools can create multiage HTML Webweavers classes to set up and maintain their home pages. Student groups can gather the project information and add it to the page. Many of these students become mentors to teachers or other students who are creating home pages of their own. Go to <http://co-nect.memphis-schools.k12.tn.us/OakForest.html> to see Oak Forest School's home page (see Figure 1.3).

As teachers integrate technology into instruction, the responsibility of organizing the learning is transferred from the teacher to the student, resulting in the student taking ownership in the process. For example, students can use the Internet for project research. This forces active learning and removes barriers between the school and outside world.

To prepare students with skills for the workplace, project work needs to include a wide range of technology. The Internet lets students collect up-to-the-minute information, communicate with experts, and compare their findings with peers throughout the world. Other technological applications for both students and teachers include word processing, using spreadsheets, record keeping, creating lesson plans, and utilizing presentation tools.

Address Assessment

As teachers brainstorm ideas for their project work during their common team planning time, they must also address assessment. Much of the assessment actually takes place while the student is performing the task. Multiple choice and fill-in-the-blank tests only measure some forms of learning. Today's restructure efforts



Meet the Oak Forest Webweavers for 1998!!

class picture

The Webweavers class was developed out of a need for the children of Oak Forest to find a location to integrate and apply the technological knowledge acquired in the computer lab. The goal of this multi-age group of children (26 students from kindergarten through sixth grade) is to use the Internet to integrate learning and display their knowledge. The Webweavers apply their knowledge of technology to set up, update, and maintain the Mousehole Computer Lab Home Page and to create individual home pages for inclusion on the Mousehole and Oak Forest Web Pages. They also create and link these web pages to each other and other sources. If you would like to know more about the "Webweavers," go to this site.

Tech. Coordinator

Figure 1.3

call for alternative assessment strategies for measuring the process a student goes through to complete a task, to solve problems using real-world data, to function within a cooperative group, to use prior knowledge to find solutions, or to determine the most appropriate technology to produce a desired result.

As teachers design assessment tools, they must also create performance standards for each task to clearly define the degree to which the content is learned by the student. Teachers are requiring students to demonstrate their understanding in more than just content areas. They are asking them to use technology to enhance and extend the learning.

Rubrics are most often used to score a performance. A rubric is a scoring tool with specific criteria identified to make scoring decisions about student work. Components include scoring dimensions, levels of achievement, descriptors, and benchmarked examples of work at each level. There are at least two types of rubrics, holistic and analytical. Holistic rubrics allow the scorers to make a decision on the global look of the work while an analytical rubric examines each dimension separately. This helps to pinpoint where to focus instruction.

If using the Hyperstudio Rubric (see Figure 1.4) to score a project, a teacher could look at a project score for planning and organization, grammar and mechanics, creativity and neatness, and content. If the student scored high in all areas except grammar and mechanics, the teacher can concentrate the instructional focus on improving this area.

As teachers develop tasks, they concurrently design rubrics, many times with the help of students. The rubric is not only used to help assess students' abilities, but it is also used to hold schools accountable for determining how well they have constructed project work to prepare students to meet standards. Since the use of technology requires a performance by the student, teachers need to outline specific criteria in a rubric so students know up front what is expected.

Align Standards and Skills

Once teacher teams brainstorm ideas, develop driving questions, and outline assessment strategies, they need to align tasks and skills to district and national standards. This ensures that they cover standards prior to the state criterion referenced tests given each year. Figure 1.5 is an example of selected standards used in projects implemented during the third year of restructure.

Plan Projects

To plan projects, teacher teams must generate performance tasks designed around essential questions that reflect what students need to know and be able to do upon completion. Performance tasks require students to create responses to tasks rather than simply pick correct answers from multiple choices. As teachers develop tasks, they must keep in mind not all students have the same intelligence. Howard Gardner's (1983) multiple intelligences theory identified seven different ways

HYPERSTUDIO RUBRIC

Dimension	4	3	2	1	0
Planning & Organization	Written text & storyboard are sequenced, organized & easy to follow containing relevant information to create an informative stack.	Written text & storyboard are sequenced, organized & easy to follow containing some relevant information, which does not interfere with the meaning of the stack.	Written text & storyboard are not sequenced, organized & easy to follow. They contain irrelevant information that interferes with the meaning of the stack.	No storyboard prepared. Written text is not sequenced, organized & easy to follow. Text contains irrelevant information that interferes with the meaning of stack.	No work!
Grammar & Mechanics	Written text in the stack contains correct consistent use of grammar.	Written text contains correct usage of grammar, with few mechanical mistakes, but mistakes do not interfere with meaning.	Written text contains incorrect usage of grammar & mechanical mistakes, interfering with meaning & understanding.	Written text contains incorrect usage of grammar & mechanical mistakes, confusing meaning & understanding.	No work!
Creativity & Neatness	The writing (or picture) is neat, creative, and presentable. Navigation buttons are consistent & easy to follow. Color, clip art, original artwork, table, graph & scanned images are all used.	Writing or picture is not very neat but does not take away from the meaning of the stack. Buttons are hard to follow but do not interfere with navigation. 4 of the following 6 are used: color, clip art, original artwork, table, graph & scanned images.	Writing or drawing takes away from following and understanding meaning of the stack. Buttons are hard to follow & interfere with navigation. 3 of the following 6 are used: color, clip art, original artwork, table, graph & scanned images.	Written text is illegible or illogical. Student fails to demonstrate how the drawing or picture fits into the stack. Buttons are hard to follow, preventing navigation. Clip art, original artwork, table & scanned images are not used in the stack or are used improperly.	No work!
Content	Written content (or picture) contains reference to the topic in all cards in the stack. Enough details are provided to enable the viewer to gain a deep understanding of the topic.	Written content (or picture) contains reference to the topic in 3 out of 5 cards in the stack. Details are provided to enable the viewer to gain an understanding of the topic.	Written content (or picture) contains reference to the topic in 2 out of 5 cards in the stack. Details provided do not allow the viewer to gain an understanding of the topic.	Written content (or picture) contains reference to the topic in 1 out of 5 cards in the stack. No supporting details are provided in the stack.	No writing or pictures!

Figure 1.4

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Selected Project Standards*

English/Language Arts

Standard 1

Students should be able to speak and write appropriately for specific purposes and audiences.

Standard 2

Students should be able to derive literal, implied, and personal meaning from different kinds of tests and orientations (literary, informative, and technical).

Mathematics

Standard 1

Students should be able to solve theoretical and real-world problems that require various approaches to investigate, understand, and apply mathematical concepts.

Standard 3

Students should be able to use mathematical reasoning to analyze and answer theoretical and real-world questions and problems.

Standard 5

Students should be able to use appropriate technology to solve problems and to communicate ideas and solutions.

Arts

Standard 2

Students should be able to apply principles of artistic organization and function (purpose) to everyday issues.

Social Studies

Standard 3

Students should be able to analyze the impact of location and the interaction between the environment and people across continents.

Science

Standard 1

Students should be able to solve real-world problems through scientific inquiry methods (questioning, predicting, experimenting, collecting, and displaying information, and drawing conclusions), using appropriate technology to communicate ideas and solutions effectively.

Standard 2

Students should be able to interpret situations that affect their everyday lives by using knowledge of energy, matter, force, and motion.

Standard 3

Students should be able to use knowledge of the similarities, differences, and interdependence of living things to analyze and assess events and actions that impact life on Earth.

Standard 4

Students should be able to use knowledge of Earth and other bodies in the universe to predict and explain natural occurrences, especially those that affect life on Earth.

*Memphis City Schools' District Standards

Figure 1.5

people are smart: verbal/linguistic, logical/mathematical, visual/spatial, musical/rhythmic, bodily/kinesthetic, interpersonal, and intrapersonal. In 1995, he added the naturalist intelligence. Using Gardner's multiple intelligences theory, performance tasks are constructed to incorporate all or some of the following:

1. The verbal/linguistic learner learns best by saying, hearing, and seeing words.
2. The logical/mathematical learner learns best by categorizing, classifying, and working with abstract patterns and relationships.
3. The visual/spatial learner learns best by visualization, using the mind's eye, and working with colors and pictures.
4. The musical/rhythmic learner learns best through music, rhythm, and melodies.
5. The bodily/kinesthetic learner learns best by touching, moving, and interacting with space.
6. The interpersonal learner learns best by sharing, relating, and cooperating with others.
7. The intrapersonal learner learns best by working alone, using self-paced and individualized instruction.
8. The naturalist learner has the ability to recognize and classify plants, minerals, animals, and cultural artifacts.

Curricular Models: Phases of Development (see Figure 1.6) outlines several different tasks teachers can use to target each of the intelligences.

Each teacher within his or her team has a role in the development of a template to document project work. If teachers teach a particular content area, then their job is to design tasks to accomplish that part of the project within their subject area. In self-contained classrooms, where teachers teach all subjects, teachers may decide among themselves which activities (whether it is math, science, or a literature focus) their classes will complete within the project. This ensures a uniform scope and sequence throughout the school as detailed in chapter 3.

Write Lesson Plans

Most teachers still find it comfortable to work from daily lesson plans to keep the class moving and on task. However, when project work is the basis for instructional tasks, lesson plans have a secondary role in the planning process. When deciding on daily lesson plans, teachers must be certain the content standards covered in the project rather than the adopted textbook drive the curriculum. The textbook is *not* the curriculum and should *not* drive the lesson. In reality, the textbook does guarantee a degree of consistency between grades and reduces the paper chase. In designing and creating projects, teacher team leaders with guidance from the principal must give consideration to choosing the best of a textbook as well as supplementing the textbook. Supplemental materials can include

Curricular Models: Phases of Development

Problem-Based Learning	Case Studies	Thematic Learning	Project Learning	Service Learning	Performance Learning
Meeting the problem Defining the problem Gathering the facts • Know • Need to know • Need to do Hypothesizing Researching Rephrasing the problem Generating alternatives Advocating solutions • Probable • Possible • Preferable	Key concepts Content/disciplines Compelling narrative Facts Small group discussions Debriefing Follow-up	Brainstorming a bank of themes Posing questions Turning a theme into a problem-solving investigation • Gathering facts • Analyzing the problem • Generating alternatives • Advocating a solution or position	First-story intellect: Gathering activities • Read • Research • Interview • View • Listen • Visit • Search Internet Second-story intellect: Processing activities • Sketch • Draw • Calculate • Generate • Develop a prototype Third-story intellect: Applying activities • Try • Test • Evaluate • Revise • Repeat the cycle • Showcase	Selecting the need for service Finding a community partner Aligning service with educational goals Managing the project • Planning • Monitoring • Evaluating Fostering reflective learning	The Prompt The Vision The Standards The Coaching Context • Explanation • Demonstration • Feedback • Performance • Reflection The Presentation The Reflection

From Problem Based Learning & Other Curriculum Models for the Multiple Intelligences Classroom by Robin Fogarty. © 1997 by IRI/SkyLight Training and Publishing, Inc. Reprinted with permission of SkyLight Training and Publishing Inc., Arlington Heights, IL.

Figure 1.6

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Internet sites, conversations with experts via mail, electronic encyclopedias, resource books from the library, periodicals, and magazines.

Textbooks are important in that they provide facts and information in an organized manner; however, by the time textbooks are published and adopted by districts the information they contain may not be the most current. The Internet can provide the most up-to-date information about a topic. Think about how a study of Germany would have changed if the Internet was used in 1990 as the Berlin Wall was opened and citizens were able to travel freely throughout Berlin.

Multiple sources of materials give students different perspectives and the ability to analyze information. Teachers must note how the materials support the project and its goals, what rationale was used in the selection of the materials, and the level of appropriateness for students.

Since the lessons are driven by the project template (see chapter 3), it may not be necessary for teachers to turn in weekly lesson plans. It may be helpful for teachers to keep daily plans on their desk, so if the principal drops in for an observation, he or she can quickly see what is being taught.

All activities in the project are standards-driven and lead to a culminating product. Therefore, if teachers can't see a relationship between a daily activity and the culminating product, the daily activity probably does not fit into the curriculum at that point in time. Providing students with performance tasks that lead toward a culminating product helps to make connections between and among instructional as well as performance activities.

Establish Student-Generated Assessment

The goal is not just to teach reading, writing, and arithmetic, but to integrate specific content areas to create lifelong thinkers and problem solvers. At the beginning of the lesson, it is important for teachers to establish criteria before they observe student performance. Students must be aware of the requirements or acceptable standards expected. Involving students in the development of the scoring tool or rubric that will be used to evaluate their performance on the activity will give them a greater understanding of what they must accomplish to achieve the desired results.

Verify that Standards Are Reached

It is important that the administration knows what is being taught in each classroom. Many administrators use classroom walk-throughs to ensure effective monitoring of instruction and activities. If possible, administrators should schedule weekly visits to ensure project outcomes are achieved in a timely manner and reflect quality work.

Misconceptions often arise about what should be observed in a restructured classroom since teachers use class time in many different ways. It would be impossible to expect students to be actively engaged in project work 100 percent of the time they are in school. A balance of instructional seminars to teach new knowledge, conferences for guided practice, and project time for applying what is learned are the components administrators need to look for when making observations.

When observers come into classrooms, they must remember that they only see a snapshot of what goes on. This is why a walk-through form (see Figure 1.7) is helpful. Observers can review previous observations to see what standards, skills, performance tasks, and technologies were used during prior visits. The goal for teachers is to demonstrate that a variety of instructional strategies and activities take place in the classroom. Teachers must ensure that standards and assessment tools are visible so it is easy to see what student outcomes are and how those outcomes are measured.

Classroom Walk-Through

TEACHER ______________________________

DATE ____________________ OBSERVER ____________________

CURRICULUM:

_____ Project work evident, project template displayed

_____ Reading: a print-rich environment is evident

    _____ Books available for the students to read (fiction, nonfiction, reference materials)

    _____ Posters and charts evident

_____ Mathematics: evidence of manipulatives, graphs, applications, computations

TECHNOLOGY:

_____ Computers are turned on

_____ Computers are on an Internet site or software is in use

CLASSROOM ENVIRONMENT:

_____ Furniture arranged so students can work in cooperative learning groups

_____ Quality student work displayed (halls, bulletin boards, classroom walls, etc.):

    _____ Work aligned with work

    _____ Rubrics displayed, assessments built into the work

    _____ Short description of work

+ = Expectations met
– = Needs attention

Figure 1.7

Chapter 2

Building a Strong Technology Program to Support Learning

Computers continue to arrive in classrooms across America. Many teachers are asking, "Now what?" The typical response from administration is to integrate technology, but what exactly does that mean and how do teachers actually do it? As design teams write school improvement plans (SIPs) detailing their actions to increase student achievement (see chapter 1), teacher teams must address the issue of integrating technology.

SIP design teams must try to provide ongoing, on-site staff development. Teachers need to feel comfortable using computer software, laser discs, video equipment, QuickTake cameras, scanners, the Internet, and e-mail along with a variety of presentation tools such as Hyperstudio, PowerPoint, or Web page tools. They must be committed to learning and using the equipment to teach to the standards. It cannot be emphasized enough that staff development is the key to integrating technology into instruction. This is a critical element because if teachers are expected to implement new instructional strategies, integrate technology, and design higher level performance tasks, they must receive directions on how to accomplish this.

Finding Funds

Administrators and teachers need to view implementing technology as an ongoing process as far as acquiring hardware and staying current with the industry. It is important for schools to secure funds at the very start to ensure a successful program.

A high-technology school can be expensive to set up and maintain. Teachers and administrators need to aggressively tap into every available resource, grant program, and business-school partnership opportunity to maintain a successful program. Administrators and teachers need to investigate all the possible district and state funds.

As an example, Oak Forest School was selected to participate in a New American Schools (NAS) restructure design <http://naschools.org> and received Twenty-First Century Funds, which are state funds allocated to the local school districts. Oak Forest School participated in the whole school restructure design that emphasized student project work that integrated technology, standards, and performance assessment. The NAS design acted as a blueprint for reorganizing an entire school rather than a single program or grade level within it. NAS provided assistance to help the school successfully implement these restructure efforts and the state provided the funding.

On a smaller scale, a fifth grade class at Oak Forest School participated in a project-based study titled Kids 'N Blues. This project was funded through a grant from Bell South Foundation. Students discovered how cultures, history, and communities were shaped through an in-depth study of the blues as an American musical form. Students wrote lyrics that were later used on a CD-ROM produced by other students from Overton High School in Memphis, Tennessee.

The resources are out there; administrators, and teachers just need to find them. Once they establish parameters for their funding, design teams can begin writing their SIP.

First-Year Goals

Design team goals for the first year are to write a SIP and select professional development to help teachers implement standards-based instruction, projects, technology, and performance assessments. Members meet monthly to monitor progress.

Assess Skills and Knowledge

The design team begins by assessing the current technology skills and project-based teaching strategies of teachers. These teams can collect information with a survey, such as the Technology and Project-Based Teaching Survey (see Figure 2.1). Once the team establishes teachers' knowledge of technology skills and project-based teaching, the design team can then determine what to address in the first year of professional development.

Design teams need to address technology issues and real-world learning experiences, in the form of project-based teaching, in the first year of restructure and continue throughout the three-year SIP. Design teams must outline technology goals (see figure 2.2), staff development agendas, and strategies for integrating project-based instruction into the learning environment.

Organize Teacher Teams

As mentioned in chapter 1, teachers work in multigrade or interdisciplinary teams. Teams need to meet as often as possible, at least once weekly during a

Technology and Project-Based Teaching Survey

Name ______________________________ Grade____
Date _______ Team ______

Reflect on your skills and integration strategies to lay the groundwork for this year's staff development focus. Please check the appropriate blank.

	Novice	Apprentice	Proficient
Technology Related:			
1. Desktop management: file manager, files, folders formatting disks			
2. Word processing			
3. Spreadsheets			
4. Databases			
5. Peripherals (printers, scanners, etc.)			
6. Software installation			
7. Internet and e-mail			
8. Search engines			
Real-World Learning Strategies:			
9. Working in teacher teams			
10. Setting up learning centers in classroom			
11. Creating portfolios			
12. Designing rubrics			
13. Using of multiple assessment strategies (observation, performance assessment, checklists, paper and pencil tests).			
14. Writing integrated units			

Comments:

Figure 2.1

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Technology Goals for Year 1

1. Organize multigrade, multidiscipline, or interdisciplinary teaching teams.
2. Select software (not content specific) to adopt as the district- or schoolwide standard. Include the basics: word processing, spreadsheet, presentation, and graphic design software.
3. Provide professional development on the following applications:
    - Desktop management (include topics such as file manager, menus, files and folders, formatting diskettes, keyboard short cuts, control panels)
    - Internet integration (e-mail, browsers, search engines, and basic navigaion on the Net)
    - Word processing
    - Spreadsheet
    - Database
    - Teaching to the standards (professional development on implementing project-based instruction)
    - Basic troubleshooting to get the machine up and running (change printer cartridges, connections, installing software) and routine maintenance

Figure 2.2

common planning time to discuss project work or lesson plans or to share information important to the business at hand. Arranging common support-teaching schedules (library, music, labs etc.) offers teacher teams a common planning time to work together. In many cases, common planning time is not provided by the district. Administrators and teachers need to work together to create support positions such as computer labs, science labs, and guidance/counseling classes to ensure teams have planning time together.

Teachers work together in teams throughout the school year to plan activities and design and discuss project work. Within the team, members need to work out roles. As mentioned in chapter 1, roles vary per school, but most teams need a leader, a recorder of minutes, a public relations person, and a technology expert. The team leader acts as a liaison with the administration and keeps communication flowing. The recorder writes the minutes from each planning session. In many cases, administrators will want to review the minutes to ensure teachers are planning in teams; otherwise, a poorly guided planning time could turn into a nonproductive complaining time or a paper grading session. The public relations person is responsible for advising the community of progress made at the school, securing adopters to sponsor activities, and arranging field trips for the students. The technology expert is the person who works with the network coordinator, or the person in charge of technology, to meet the technology needs of the team. The technology expert is also involved in the selection of software to build a school library or update an existing one.

The role of the network coordinator is vital to maintaining computer systems. A network coordinator maintains the computers to ensure they are all online, in good working order, and have all the needed software installed. This person serves as the point of contact between the school and the district's information technology department or an outside technical support service. Unfortunately, many schools cannot afford this resource person. As an alternative, schools can hire high school or college students on a part-time or internship basis to help maintain the computer systems. For example, Oak Forest School hired a high school student to help out on weekends and occasionally after school. The Parent-Teacher Organization (PTO) paid the student a modest stipend. Patti Scanlon, Curriculum Coordinator for Oak Forest School, states "Our high school student is not only helping us maintain our computers, but he is teaching us new and exciting troubleshooting techniques as well!"

Incorporate Ongoing Evaluation

During the first year, most teachers begin to feel comfortable with basic technology operations and the integration of projects into the classroom. Administrators should be able to see evidence that computers are being used on a daily basis and that quality work is being displayed. Teachers can use the Instructional Checklist for Quality Work (see Figure 2.3) for self-evaluation or administrators can use it when they visit classrooms. At this point teachers and administrators should see students engaged in tutorial software, word processing, and some research using the Internet. Remember Rome was not built in one day! Teachers and administrators need to think of integrating technology in the classroom in the same way.

Build a Software Library

As schools or districts begin building a software library, they need to purchase interdisciplinary, noncontent specific software. Students can then use the software in a wider range of applications, from creating to manipulating data. The following is by no means a comprehensive list of necessary software programs, but it's a good starting point:

- Word processing
- Spreadsheet
- Database

Instructional Checklist for Quality Work

Quality Indicators	Observable Evidence
Students are engaged in active, hands-on learning.	
Work given to students is clearly linked to a product or performance.	
Teacher's role is a facilitator or coach of quality student work.	
Students are engaged in cooperative, collaborative actions with peers and adults.	
Students' work is engaging, challenging, and relates to work found in the real world.	
Teachers design and use multiple assessment strategies to measure student progress.	
A standards-based curriculum, rich in content is provided to *all* students.	
Teachers and students use available technology to enhance student learning.	
A variety of curriculum resources are available to students.	
Teachers consult colleagues when making decisions related to instruction.	
Work, rich in content, is available for *all* students.	

Figure 2.3 Adapted from Center for Leadership in School Reform (1997), *Observation Guide for Instructional Accountability Initiative*, p. 22 G. Used with permission.

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- Concept mapping (e.g., Inspiration)
- Presentation (e.g., PowerPoint, Hyperstudio)
- Time line
- Graphing
- Web page (homepage)

Once a general library is established, individual classroom teachers can request or purchase content-related software titles as needed.

Develop a Staff Development Schedule

To accomplish the goals for the first year, the design team needs to develop a schedule for staff development. Figure 2.4 outlines a staff development schedule that can be implemented during inservice and faculty meeting times. An experienced faculty member, a district-level trainer, or an outside consultant can facilitate these sessions. The design team needs to assess available funds when making this decision.

Professional development for the remainder of the year is focused on changing instructional strategies to implement project work in the standards-based curriculum, incorporating technology and multiple assessment strategies to measure students' progress as detailed in the last three chapters in this book.

Involve Parents

Toward the end of the year, teacher teams can invite parents to a Technology Night to bring parents into the school to see the progress their children have made. The Technology Night can take the place of a spring parent-teacher meeting. Each student needs to display at least one artifact that demonstrates the use of technology, such as book reports that they produced with a word processing program or charts that they produced with a spreadsheet program.

To prepare for the evening, teachers can place student work on desks and open a different piece of software (electronic encyclopedia, word processing, spreadsheet) on each computer. Also, open a favorite Internet site on at least one computer. A weather site is always a hit, and students can show their parents how to check the forecast on the Internet.

Let the students take charge and lead the evening. Teachers act as facilitators and answer questions on an as-needed basis while the students show off their work and skills to parents and friends. Students can show their parents the different software applications they use as well as products they produced. Teachers should try to avoid long conferences with parents and to keep the time positive and upbeat for the students.

Year 1 Staff Development Schedule

August: Schedule training during in-service week before school begins or at weekly faculty meetings.

- Organize multigrade or interdisciplinary teacher teams
- Teachers work within their teams to plan activities and projects
- Technology training: desktop management, word processing, and other available software programs

September: Schedule training on any in-service days or at weekly faculty meetings.

- Technology training: spreadsheets
- Professional development training: how to integrate technology with national, state, and district standards
- Devote at least one faculty meeting for teachers to work in their teams

October

- Technology training: basic troubleshooting and computer maintenance (changing printer cartridges, connections, installing software, basic operation of the local area network, etc.)
- Professional development training: teaching to the standards
- Teacher teams continue planning

November

- Technology training: Internet, e-mail, browsers, and basic navigation on the Internet
- Set up e-mail accounts for each teacher; begin communicating within the school via e-mail

December

- Technology training: database software
- Teachers continue working and planning within their teams

January

- Technology training: expand Internet training to include a session on how to use a search engine
- Teacher teams begin to surf the net as they continue to plan activities for students

February

- Professional development training: project-based instruction and terms outlined in the Goals for Year 1 chart (see chapter 4)
- Teams plan project work to include an Internet site

Figure 2.4

Reflect on the First Year

As the first year draws to a close, teacher teams need to reflect on their first year of restructure: how they integrated technology and new strategies. A good place for teams to start reflection is to review the Technology and Project-Based Teaching Survey (see Figure 2.1) and reflect on the progress they have made. Reflection helps to lay the groundwork for the second year of technology integration and project-based instruction.

It is important to remember that many skills and teaching strategies are touched on or introduced in the first year. Some teachers may already have experience using technology; others are still novices. Design teams can consider a teacher-mentoring program as they design plans for the second year of the SIP. A teacher-mentoring program pairs experienced teachers with new teachers to help them settle into the grade level, school, or restructure design.

If evidence exists that students are using technology, work is high quality (see Figure 2.3), and teachers are collaborating and working together in teams, the first year is a success!

Second-Year Goals

As the second year of restructuring begins, teachers inevitably feel more comfortable working within a team. Administrators can monitor and adjust teams to ensure the levels of expertise are distributed among the faculty. This is a good time to introduce a technology mentoring program. Teachers who are more experienced with the use of technology can pair up with new teachers joining the faculty and with those who feel they need a little extra practice or support.

Set Goals for the Second Year

Now that the basics of computer operation are mastered to some degree by most teachers, technology goals in the second year can focus on specific software licensed to the school. Technology Goals for Year 2 (see Figure 2.5) is an example of goals the design team can outline.

Once the design team establishes the goals for the second year, the team can outline a schedule. Similar to the first year's agenda, the schedule for the second year of restructure should focus on technology and professional development training (see Figure 2.6).

Technology Goals for Year 2

1. Set up a technology mentoring program among teacher teams.
2. Introduce concept mapping and presentation software such as Inspiration, Web page software, Hyperstudio, and PowerPoint.
3. Have teachers demonstrate technology integration throughout the curriculum with classroom project work.
4. Provide Internet researching sessions so teachers feel more comfortable with search engines and discovering information on the Internet. Emphasize bookmarking sites as opposed to students randomly searching the Internet.
5. Provide workshops on the use of peripherals, such as scanners, digital cameras, laser disc players, etc.
6. Provide workshops on the use of a laptops or portable computers for data collection outside the classroom.

Figure 2.5

Provide Teacher Training

The second year of the SIP begins by examining the list of licensed software products ordered during the previous year. Before teachers can integrate these products into their instruction, they need a solid understanding of how the products work. Many software companies provide training sessions for their software. If company training is not available, network coordinators or computer lab teachers can train teacher teams; otherwise, teacher teams can divide the task of teaching the software to each other. It is unreasonable to think teachers can integrate every product into every project. The number of products purchased determines how design teams set up professional development.

In the second year of a SIP, Oak Forest School purchased four software products: Hyperstudio, Inspiration, PowerPoint, and Claris Homepage. The design team felt teacher teams could integrate these four titles across the curriculum. The principal, Jim Luckey, felt it would be cost prohibitive to send teachers to workshops for each new piece of software. The teachers who filled the technology role within each teacher team went to training at the district's Teaching and Learning Academy (a staff development facility for teachers throughout Memphis City Schools) or to out-of-district workshops to master these four pieces of software. Teachers were divided into four groups, and each teacher that received training taught the rest of the faculty how to use these four software programs.

Year 2 Staff Development Schedule

August

- Review software purchases from the previous year
- Technology training: software programs purchased previous year; review e-mail if necessary
- General messages disseminated via e-mail instead of during faculty meetings

September

- Technology training: software programs purchased previous year
- Teacher teams plan for project work

October

- Technology training: software programs purchased previous year
- Teacher teams plan for project work

November and December

- Teacher teams plan for project work
- Professional development: strategies for integrating technology
- Require support staff to take an active role in each team's project to extend work in support classes to include resource teacher, music teacher, science lab teacher, computer teacher, ESL teacher, gifted teacher, guidance counselor, art teacher, or physical education teacher

January and February

- Technology training: workshops to operate peripherals

March

- Teacher teams plan for project work to incorporate peripherals

April and May

- Technology training: review programs and peripherals according to teacher needs
- Review SIP, staff development needs, and project ideas for possible student projects for the next school year

Figure 2.6

Teachers rotated through the training sessions attending two weeks of after-school technology training on each product. Teachers then paired with mentors (teachers who had a deeper understanding of how to use the software) as they began using the software in the classroom.

Once the initial software training is complete, design teams need to provide professional development training on integration strategies. Teachers need a solid understanding of how to use technology to increase student achievement. Teachers should use technology as a natural extension not as an add-on or separate task for students to do. Teachers can use faculty meetings as a time to plan projects within their teams. Support teachers can work with all classroom teachers to extend projects into instruction within support classes.

Teachers know technology is integrated when visitors walk into their classrooms and see the use of technology as a seamless component. Visitors should also see some of the following:

- Student work has a specific goal, and activities use technology as a logical extension
- Students use technology to solve a real problems
- Teachers can describe how students are benefiting from technology (If students or teachers have difficulty explaining how technology is improving the activity, then the technology probably is not benefiting the activity.)
- All students should be able to participate (While individual differences exist, all students should benefit from the use of the technology if it is truly integrated.)

Teachers also need to think of more than just computers when thinking about integrating technology. Calculators, audiotape players, overheads, laser disc players, VCRs, probes, laptop computers, scanners, video cameras, and videoscopes are just a few items teachers can use to integrate technology.

Move from Using Technology to Integrating It

About two months into the school year, most teachers feel fairly comfortable operating computers, using e-mail, and navigating through software. Now it is time for teachers to transfer this knowledge to students. One primary goal of schools is to make sure every student is competent in the use of current technology. Students need to learn the value of making use of technology as a necessary and important tool for their learning.

Using technology to produce products, performances, or exhibits, regardless if it is used at the beginning of the project or to produce a culminating activity, should extend the students' understanding if it is truly used as a tool.

One year, a fifth grade class at Oak Forest School did a weather project to meet the Memphis City School Standard 1 Science: Students should be able to solve real world problems with scientific inquiry methods (questioning, predicting, experimenting, collecting, displaying information, and drawing conclusions), using appropriate technology to communicate ideas and solutions effectively. The purpose of the weather study was for students to decide the best time of the year to take a dream vacation to a location of their choice. Some of these fifth graders searched the Internet and discovered how to build a weather site <http://www.weather.com>. Other students researched where hurricanes have occurred, compared hurricanes by year, and graphed their results <http://www.nhc.noaa.gov/index.html>. Some students even built barometers from information discovered on an electronic encyclopedia CD-ROM. Many students spoke with experts from The Weather Channel <http://www.weather.com> on cloud formation via e-mail. Once these fifth graders gathered all their data, they created presentations using Hyperstudio software. Assessments occurred throughout the project: checklists to determine if students understood concepts, multiple choice tests to measure knowledge gained, and performance assessments for demonstrating how the weather station worked. Students reflected on what they were learning in journal writing and used a rubric to evaluate their Hyperstudio presentations.

If schools have computer teachers, they can make sure the technology goal is met in computer labs. If computer teachers or labs are not available, teacher teams need to decide what technology skills and software applications they want to specialize in and divide the teaching tasks among themselves. Whether in a lab or in the classroom, teaching the mechanics of how students use software is one task and integrating it into instruction is the second task.

Technology Labs or Teachers

Many school labs are preprogrammed to deliver only remedial instruction or drill and practice exercises. This type of lab teaches students the basics of using technology, but it is important to realize this is not the only way to use technology to increase student achievement. As computers and peripherals are added or existing resources are redistributed within the school, it is important for teachers to try and create a learning environment that teaches students how to use software. The ideal situation is to have a computer lab teacher provide instruction on the mechanics of using software programs. If the school does not have a lab, a technology teacher could move around the school or among classrooms with the teaching team and teach these skills within a regular classroom to small groups of students. The key is to provide hands-on instruction while teaching these applications. Once students have these skills, teachers can easily integrate technology into different disciplines.

Technology in the Classroom

Whether schools are departmentalized or self-contained, teachers still find it difficult to teach all that is required in their content area as well as the mechanics of using the software. Without a lab, teachers can teach in small groups within the classroom in a "center" environment. Centers are groups of students that are working on several tasks simultaneously. Teachers can structure the classroom in centers where the computers or other technology (video, calculators, tape recorders, etc.) are used on a rotating basis. Teachers can also rotate among their colleagues' classrooms until all students can use each software application. Dividing the tasks of training students on the mechanics of how to use the software makes the job easier for all.

Utilizing Peripherals

If funds are available or grants are awarded to acquire peripherals, such as scanners, digital cameras, laser disc players, printers, or laptop computers, teachers need training so they can begin using this equipment in project work. Many times it is possible to find online courses to accomplish this task. For example, a course on operating a QuickTake digital camera can be found at <http://www.memphisschools.k12.tn.us/admin/tlapages/ academyhome.html>. If an online course is not available, sometimes the local sales representative can conduct training. This approach extends learning beyond the classroom walls and facilitates the concept of lifetime learning. Technology is changing rapidly, more facts are emerging daily, teachers need to consistently update their technology skills to teach their students necessary skills for the twenty-first century workforce.

Reflect on the Second Year

As year two draws to a close, teachers can reflect on their growth and use of technology in the classroom. It is important to share these reflections with each other to help the team plan for the third year of the SIP. Teachers can create surveys, such as Reflections About Projects (see Figure 2.7), to collect this information.

Reflections About Projects

Name ____________________________ Team ____________

Reflect on your project-based approach to learning while integrating technology, and fill out the following form for one project implemented during this school year. Your answers will help lay the groundwork for next year's projects to ensure a uniform scope and sequence to increase student understanding.

Standards Addressed in the Project:

1. Content/Skills: Identify the content and skills taught in instructional seminars and practiced during conference time.
2. What reading strategies were included in the project?
3. How are learning/reference centers, cooperative groups, or community resources used to appeal to the multiple intelligiences of students?
4. How is technology integrated into the project work?
5. Describe how the Internet was used in the project? (research, e-mail, experts, etc.)
6. How was the media center used throughout the project?

Figure 2.7

Third-Year Goals

As the school or district prepares to begin the third year, all the components of restructure, standards, projects, technology, and multiple assessment strategies start blending together. Teachers feel more comfortable integrating technology as a result of the strong technology training and professional development programs implemented during the first two years. Project work, explained in detail in chapters 3 and 4, becomes a way of life in the classroom. Professional development can begin shifting toward strengthening the curriculum.

Technology Goals for Year 3 (see Figure 2.8) outlines possible goals for the third year. When working on the third year of implementation, the design team must keep in mind staff members (new and veteran) who are operating at the novice level. It is important to provide a review from training sessions offered during the previous two years. Year Three Staff Development Schedule (see Figure 2.9) provides a possible plan for the third year of implementation.

Technology Goals for Year 3

1. Reinforce and repeat any training from years one and two for new teachers and those needing extra help.
2. Learn to troubleshoot and maintain computers.
3. Create a school Web site.
4. Link class Web pages to the school's Web site and include information on project work progress.
5. Introduce a homepage class where students (K–12) create their own Web pages.
6. Offer an Internet research class to help teachers locate sites for their instruction.
7. Invite each class to participate in or author an online project.
8. Encourage teachers to participate in or author a WebQuest.
9. Validate the Internet as a useful resource in the classroom.

Figure 2.8

Review Technology Skills

The design team always needs to advise teachers to begin the year by reinforcing and repeating any training from previous years to ensure the faculty is proficient in using technology and possesses the most current skills possible. A refresher workshop on basic troubleshooting and computer maintenance is always necessary at the beginning of each school year.

Year Three Staff Development Schedule

August

- Technology training: quality contributions of student work on the Web page; also review and reinforce any training conducted in years one and two that is necessary to ensure all teachers possess current technology skills
- Review basic troubleshooting and computer maintenance

September

- Technology training: Web page design
- Professional development: integrate technology into project work to create quality student products and performances

October

- Technology training: Continue Web page training and provide time for creation
- Create multiage home page and research classes

November and December

- Technology training: home page training

January and February

- Technology training: effective Internet searches
- Professional development: collaborative online projects

March

- Technology training: WebQuest
- Professional development: integrate Internet in all disciplines

April and May

- Internet validity checks

Figure 2.9

Create Web Sites

Even if faculty members have already published a Web page for schools, it is important to establish Web site criteria to ensure a quality site that represents the school or class and exhibits students' work. With all the commercial Web page makers on the market, it is not necessary to create a school's page from scratch (HTML code). Web66 <http://web66.coled.umn.edu> is an excellent site to find ideas for designing a site, and schools can post their site in the registry at <http://hillside.coled.umn.edu/others.html>.

A quality site begins with factual information about the school, including the mission and vision statements and pictures of the school, the administration, and faculty. It always helps to include graphics whenever possible. Graphics make the site more interesting and easier to understand. Viewers can actually see the school, its students, and faculty or, better yet, take a virtual tour just as if they were really there. Just as the saying goes, A picture is worth a thousand words.

What distinguishes a good Web site from an outstanding one is the use of student work and inclusion of resource links. Web sites can display in a Kids or Teen Corner student products and performances created during project work. Teachers must check district acceptable use policies regarding student work on the Web. A What's Happening At Our School section can explain what projects teams are working on, hot-linking Internet sites used in the study. A Teacher References section can post project templates aligned with integrated units (see chapter 3). A Useful Bookmark section can hot-link other relevant sites. This enables the site to emerge as an important educational tool and at the same time documents student performance for parents.

Teachers can create a class home page. Depending on the server space in the district, students can also have individual pages. This is a great way to display student work, allowing parents access to what is going on in the classroom anytime and anywhere they have access to the Internet—even at the public library. What a great way to increase the communication between parents and school! Again, it cannot be emphasized enough for teachers to check the acceptable use policy for the district as to what they can publish on the Web.

To support student publishing, teachers can offer a class to teach K–12 students how to create a home page. Oak Forest School created a Webweavers class (see chapter 1) to help students create and maintain home pages. With younger students, it works well to pair them with older students, forming a mentoring team and encouraging multiage tutoring. If schools have self-contained classrooms, students can attend this class once a week. When schools are divided into different periods in middle and high schools, a creating a home page class needs to be added to the curriculum.

Teach Research Skills

Another valuable class for both students and teachers is an Internet research class; teachers can follow the creating a home page example to structure this class.

Teaching students productive strategies to use and locate information on the Internet is a valuable skill. For example it's important for students to learn to use search engines effectively. A search engine is a Web-based tool that finds Web pages based on specified criteria and keywords, similar to a library's card catalog system. The purpose of the research class is to help students acquire effective strategies for locating information. This is useful for their project work. It is also useful for teachers who need additional resources but do not have time to surf the Internet.

Explore Collaborative Projects

Many collaborative projects exist on the Internet. Extending students' abilities to reach outside of the classroom and into the real world is the essence of restructure. Collaborative online interactions offer the following elements:

- Inquiry-based learning environment
- Collaboration with others around the globe
- Contact with experts
- Real-world research and up-to-the-minute resources
- Publishing of student work and documentation of global participation in a project

Projects such as *Journey North - A Global Study of Wildlife Migration* <http://www.learner.org> sponsored by the Annenberg/CPB Projects make it possible for classrooms to learn about the migratory patterns of animals and the importance of preserving their habitats along migratory routes. Teachers can use sites similar to this one to extend their own projects, allowing students to contribute observations and interact with experts who are conducting scientific studies to solve real world problems. The Global SchoolNet Foundation (GSN) <http://www.gsn.org> is another excellent source for harnessing the power and potential of the Internet. GSN is a nonprofit organization that collaborates with schools and community organizations to design, develop, support, and manage hundreds of collaborative learning projects each year.

Incorporate WebQuests

During this third year, teachers need training on the design and use of WebQuests in their project work. In the summer of 1995, Bernie Dodge and Tom March of San Diego State University developed an innovative way to integrate the Internet into all disciplines at any grade level. Their activities became known as WebQuests. According to Dodge, a WebQuest is an inquiry-oriented activity in which most or all of the information used by students is drawn from the Web. WebQuests are designed to use students' time well, to focus on using information rather than looking for it, and to support students' thinking at the levels of analysis, synthesis, and evaluation.

The instructional goals of WebQuests are knowledge acquisition and integration, as described in Dimension 2 in Marzano et. al's (1988) *Dimensions of Thinking Model* and extending and refining knowledge as described in Dimension 3. After completing a WebQuest, students have analyzed the information, transformed it, and demonstrated an understanding through the creation of a product or performance.

Teachers can carry out their professional development in WebQuests online <http://edweb.sdsu.edu/webquest/webquest.html>. Teachers can also design, publish, and find examples of existing WebQuests to use in their classroom. Explore some of the projects others have authored, obtain training materials, or participate in online courses that teach about WebQuest at <http://edweblsdsuledu/webquest/webquest.html>.

Evaluate Internet Sites

By the third year of reform, teachers have a solid understanding of the Internet and of how to integrate it into instruction. With more and more sites online, teachers need an evaluation process to ensure Internet validity. Good instructional sites should meet the following criteria:

- Display content clearly and easily for students to view
- Provide strong curriculum components that fit into existing teaching and learning
- Allow interactive components to interface with students
- Be certain the site is easy to navigate
- Contain appropriate readability level for the particular grade level
- Identify quality links that exist throughout the site to enable students to experience (virtually) their learning

Reflect on the Third Year

As year three draws to a close, administrators and teachers should assess how the four components of school restructure are being implemented: standards-based curriculum, integration of technology, project-based teaching and learning, and performance assessments. Teachers can perform self-assessments to determine teaching and learning strategies for the next year. The assessment of where the school is at the end of three years will shape future professional development. By now many teachers are able to mentor new teachers coming to the school, so much of the training can be handled in house.

Alternatives to the Three-Year Plan

The three to five year time frame, assuming schools are beginning at ground zero, divides restructure tasks into manageable chunks. For many teachers these restructuring efforts are the total opposite of what they have been used to in their classrooms. They are trying to change the following:

- Passive learning to active learning
- Exclusively grouping to inclusive grouping, giving all equal chance
- Memorizing to critical thinking
- Classroom-based thinking to world-based thinking
- Teacher-centered instruction to student-centered instruction

These strategies take time and professional development. Shortening the time frame may result in change only at certain grade levels or in a few classrooms. These teachers could then mentor others as they adopt these educational values. Administrators need to decide up front if they are seeking whole school restructure or just change in certain areas. They need to assess what level of expertise in the above strategies the teachers are at as they alter the time frame. Ultimately, the design team needs to outline a time frame that suits the needs of the teachers.

Technology Is the Key

Technology, even with its seemingly impossible barriers, is the key to preparing students to be successful citizens in the twenty-first century. Teachers may be surprised to find that students, even the lowest achievers, intuitively integrate technology as they see it as a tool to accomplish their tasks quickly, neatly, and more efficiently. As technology continues to develop, so will its uses. Teachers must continue to invest time in their technology training and professional development and think, “Yes, I can make the difference!”

Chapter 3

Designing Projects for Real-World Learning

As discussed in chapter 1, teacher teams can develop integrated units following Erickson's model (1996) of using a topical theme centered around a conceptual focus that integrates processes and develops essential understandings. This leads students beyond fact-based learning to conceptual learning. The topical theme is the thread that runs through all critical content areas from all disciplines. The conceptual focus takes students to a higher level of thinking, providing an organizational structure for linking information and content. The processes, such as reading, writing, listening, speaking, computing, and thinking, are the abilities students use as they learn concepts and skills. Essential understandings give students the big picture and enable them to use processes and skills to move beyond facts and topics to concepts and generalizations, using knowledge to solve problems. This provides the framework for meaningful learning as students progress toward achieving standards.

Curriculum Design

As the design team determines what the school needs to address in the school improvement plan (SIP), the place to target is the state achievement test scores. If low scores are found in mathematics and science, for example, then the design team needs to focus on designing appropriate math and science curriculum that addresses those needs. Administrators and teachers must design the curriculum to take students beyond the knowledge, comprehension, and application levels of Bloom's Taxonomy (1956) and begin teaching the concept to focus on analysis, synthesis, and evaluation. Since low test scores have initiated restructuring efforts in many districts and student work has focused on the lower end of Bloom's taxonomy, it seems logical to assume that teaching only at the knowledge, comprehension, and application levels does not improve test scores. If it did, states would not be fighting for vouchers and charter schools. Administrators and teachers can use the following steps when designing the curriculum for an integrated unit:

1. Identify a unit theme.
2. Identify a major concept.
3. Web the topics around the concept and the theme.
4. Write essential understandings.
5. Develop guiding questions.
6. List complex performances and skills.
7. Write weekly instructional activities.
8. Create culminating products and performances.

Planning Integrated Units: A Concept-Based Approach. 1997. ASCD videotape, professional development program.

A teacher decides to design an integrated unit on the rain forest. The teacher identifies the topic of rain forests because of a new IMAX theater film coming to Memphis. Since the class is taking a field trip to see it, students needed some background knowledge prior to going. However, if the teacher just teaches the facts about rain forests, the teacher is addressing instruction at the lower levels of Bloom's Taxonomy and not requiring students to think at higher levels. What is needed is a lens or concept that students can look at when studying rain forests. Since the IMAX movie focused on how the rain forests are diminishing each year, the teacher chooses "change" as the concept. Students need to finish the study with the big idea of change and how it affects the rain forests and the globe. This results in a much deeper understanding, because the teacher could never teach all the facts about rain forests. The guiding questions are "How are rain forests changing?" and "How does the decrease in the area of rain forests affect the environment?"

The teacher requires students to demonstrate their understanding of how the decreasing amount of rain forests on the planet affects the plant life and animal life. Students demonstrate their understanding by creating dioramas of how plants of the rain forest would look if the upper layer or canopy of the rain forest was destroyed. They research rain forest on the Internet, in the library, and in the reference center of the classroom (the teacher had gone to the public library and checked out several resources on rain forests). They create questions for peers to answer in a scavenger hunt format.

Weekly and daily activities include a lesson on proper searching using a search engine, grammar lessons on writing questions, and content knowledge to help identify the layers of the rain forest. The class also uses a laser disk to accompany the textbook. Students' culminating products of dioramas and written reports explain changes that are occurring in the rain forests. Students also write letters to Congress giving suggestions for how to help the rain forests of the world.

This integrated unit not only teaches all the necessary skills of the content area, but it also brings real-world concerns into the classroom.

Project-Based Instruction

Project-based teaching allows students to take the knowledge, skills, and concepts in a unit and apply them to an authentic application. It requires students to attach a purpose to the information they acquire. The project should reflect needs written in the SIP. Again, managing this new teaching strategy requires the skills of teachers managing multiple activities at the same time.

Complete a Project Template

Once teacher teams design a curriculum model unit (complete examples can be found in appendixes A, B, and C), they are ready to develop a standards-based, integrated project template (see Figure 3.1). The curriculum design is an integrated unit of study centered around a particular topic such as Native Americans, rain forests, or environment. The project template allows teachers to web the topic around the concept and theme. It serves as the part of the project where students apply the knowledge they have learned to an authentic application. The template outlines the performance tasks, multiple intelligences (see chapter 1), technology, essential questions, standards, skills, and culminating activities addressed in the project. Teachers may ask, "What is the difference between an integrated unit and a project?" A project is the practical, real-world application of the integrated unit. Project work allows students to extend what is learned in the unit, constructing meaning while linking knowledge, concepts, and generalizations. In short, students must understand how to take knowledge acquired in the unit and apply it to real-world situations.

Outline Essential Questions

Since students are intrinsically curious, why not bring a project together through an essential question? Essential questions guide students as they search for meaning and understanding within a body of knowledge. Essential questions pull once fragmented curriculum strands together, orchestrating the purpose, goals, and objectives while linking and aligning content. They do this by asking a probing question, one that makes students think about the big picture. These questions focus student thinking.

Teachers introduce the unit to students by establishing the students' relationship with the content area, such as literature, science, or mathematics. If the focus is literature, teacher teams can create a balanced literacy program at all grade levels through teacher led reading; language experiences; shared, guided, and independent reading; writing; and sharing responses. As noted in the unit example Where Have You Gone, Joe DiMaggio? (see appendix A), all subject areas are brought together under one topical theme: the role of the hero in literary tradition. Process skills, such as creating, thinking, computing, and language arts, are found and used in all of the disciplines or content areas. This is important to

Standards-Based Integrated Project Template

Project Title:
Team #:
Grade Level:
Teachers:
Time Period:

Culminating Activity:
Essential Question:

Literature/Reading (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Science (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Mathematics (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.
The Arts (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Social Studies (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Health & Physical Education (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.

Figure 3.1

remember when designing curriculum, because if students cannot read or write, they are not likely to be successful in other content areas.

At this point, teachers *must* plan together in teams, especially in higher grades where teaching is departmentalized. When the language arts teacher sets the stage for the unit by introducing a novel or short story, the other teachers (social studies, mathematics, science, art, etc.) weave skills, facts, and topics through the conceptual focus framing the entire unit of instruction for all disciplines.

Once teacher teams establish such a conceptual framework and while the students' knowledge and skill base is forming, teachers can begin brainstorming with their classes to link the unit to a real-world application. Teacher teams must first jointly determine an essential question for the project; it is important to keep in mind that the integrated unit becomes the infrastructure of the project. Classroom instruction no longer revolves around the textbook. Teacher teams determine the learning focus and basic skills and concepts needed in the context of interesting, real-world situations. Teachers should think of textbooks as one of many resources available to students instead of the only source of information in a course.

Discuss Projects

As discussions begin about the project, teachers need to continually highlight the conceptual focus, essential understandings, and central topic of the integrated unit. Teachers can lead brainstorming sessions with questions directly linked to desired products and performances. This is done to ensure that the product or performance is such that it represents a culmination of skills and concepts learned throughout the unit. Teachers give students a list of possibilities, and students begin to decide which topics are relevant to the study and which topics they need to discard. For students, this creates a sense of ownership in their learning. As they become more familiar with the tasks ahead of them, they realize they have a direct input into the design of the project. Students have a choice, which often leads to excitement that permeates throughout the room! At the same time, this gives teachers an opportunity to get a feel for the different intelligences that exist among students and the relationships between the brain processes and the computational thoughts brought about by the increased use of technology in instruction (Sylwester 1998).

Research on the brain has uncovered that learners do not store a picture of an event. The brain processes knowledge such as an event as a pattern of connections (dendrites/synapses) among brain cells (neurons). When learners want to recall the event in their mind, the components from the different places come together through a pathway to bring up the image. Lowery (1998) states, "For the brain to construct knowledge and behaviors, it must take in data that it can use for the construction. The only way the brain takes in data is through the sensory perceptions that enter through the windows of the body's five senses" (26).

Using technology engages students in their learning. As students carry out tasks, they connect prior knowledge to the new knowledge they are acquiring.

With new teaching strategies and the use of technology as a tool to accomplish goals, students compute thoughts in a logical manner through active experiences. This is revealed by the different types of tasks or higher level thinking skills each student favors. Teachers can design tasks that require students to demonstrate understanding through one of the action verbs in Tasks that Promote Higher Order Thinking (see Figure 3.2). Asking students to analyze or defend their positions on how they would correct the diminishing rain forest area requires more complex thinking skills than if teachers just ask students to identify the current land area of the rain forests.

Tasks that Promote Higher Order Thinking

analyze
brainstorm
calculate
categorize
classify
collaborate
combine
compare/contrast
compose
conclude
convert
construct
create
critique
debate
deduce
defend
design
diagram
examine
graph
illustrate
justify
measure
organize
outline
persuade
predict
revise
role play
summarize

Figure 3.2

Define Project Length

Teachers must consider project length at this point. Project length depends on how in-depth the study needs to be, the skills knowledge, and how much time will be devoted to the project each week. Teachers should add a couple of weeks to allow for snow days, assemblies, new students joining the class, or any other unforeseen delay. Of course the more content, skills, performances, and products teachers require for the project, the longer it will take to complete. Teachers should decide on criteria at the beginning of planning, based on scores from state achievement tests and/or goals outlined in the SIP.

So what is an optimum length? Teachers can consider what is both grade and age appropriate for a particular grade level and for the attention spans of students. Practical considerations suggest that teachers begin by taking small steps: from one to two weeks to a whole grading period before moving into semester- or year-long projects. Again, teachers need to take into consideration students' age and development along with their own comfort level in using a project-based approach to instruction.

Designate Schedule Planning Time

For effective implementation, the design team and the school principal must provide teachers team planning time to construct their projects. Teachers plan the project to ensure certain concepts and skills are covered. As teachers introduce the project, they can ask students for input and add activities or tasks if the suggestions are in line with the learning goals set by teachers. This gives students ownership while still ensuring the project helps them reach standards identified in the project.

Teachers must have conversations not only across the hall but across grade levels and disciplines to determine the skills, content, and topics to cover and how these projects can extended into authentic learning opportunities for students. Teachers not only need to teach the content in their classrooms but to reach into the community for resources, learning connections, and guidance in project work. This serves several purposes:

- Makes learning connection from school to real world
- Gives students reasons why they need to learn about this topic
- Helps students access the latest information
- Shapes instruction around current events and provides teachable moments

Integrated units address numerous standards that teachers can weave into the project. The key is for teachers to teach using content standards, then to design projects around high interest topics—ones that easily relate to students so they achieve a level of performance that meets or exceeds standards.

The Process at Work

To understand this process, look at a portion of an integrated unit (see Figure 3.3). The title, Where Have You Gone, Joe DiMaggio?, instantly captures most students' attention because they naturally relate to sports figures (see appendix A for the complete unit).

During instructional seminar time, prior to beginning project work, teachers should teach skills and concepts in the context of the unit to strengthen students' cognitive thinking processes. Teachers must lay this groundwork prior to introducing the project. All students within a class can work on the same project. They may work on different tasks within the project to become experts and share their knowledge with the rest of the class. Since teachers plan in teams, several classes can work on the same project and collaborate in planning. Again, each class may specialize in one part of the project and share findings with others.

As teacher teams begin brainstorming ideas for performance tasks for the project template (see Figure 3.1), they look at the essential understandings, the conceptual focus, and the activities addressed in the academic areas of the

Where Have You Gone, Joe DiMaggio?

An Integrated Unit

Topical Theme:	The Role of the Hero in the Literary Tradition
Conceptual Focus:	Heroes/Change
Processes:	Reading, Writing, Listening, Speaking, Computing
Essential Understandings:	• People may share similarities and differences with the heroes they admire • Life experiences shape and change people's character • "A man can be defeated but not destroyed" (*The Old Man and the Sea,* Ernest Hemingway)

Figure 3.3

integrated unit. Teacher teams can direct discussions with questions similar to the following:

- What product or performance can students create in their project work to build and develop character?
- What changes can students make to achieve this goal either in the community or on the school's campus?
- What community or outside resources are available?
- How can the project create an environment where students can experience the role of a hero like those experienced by the characters in literature?

One way teacher teams can answer these questions and fill a community need is through a culminating performance task of designing and building a baseball field on the school's campus or nearby community park. Students then can make a concrete connection between the content learned in the unit of study and a real-life activity—creating a field to play baseball!

The first step is for students to read, discuss, and work through the activities in the unit. Teachers need to create activities that teach certain skills. If students need to write a letter to the city to get permission to build a baseball field, teachers need to teach the skill of writing a persuasive letter. Students can learn the parts of the letter in seminar time, then practice writing letters to each other or to friends. This builds the letter writing skills in the unit prior to asking students to demonstrate their understanding of how to write a persuasive letter in the project when they write to the city commissioners. This builds a foundation to begin project work.

The performance tasks listed on the project template should serve as an ongoing, interactive, collaborative assessment of the students' understanding, aligned with integrated instruction and student-centered instruction. Since these tasks are the actual assessments of the skill or concept, they must be rigorous, engaging, authentic, and valid (Planning Integrated Units 1997). They move students toward achieving an essential understanding in a real world context. As the students determine what materials and tools they need to build a baseball field, they also need to understand how to use machinery.

Looking at just the science performance tasks on the Joe DiMaggio project template (see Figure 3.4), the first task is to identify, label, and illustrate simple and complex machines. To perform this task, students need to go out into the community and find examples of simple and complex machines related to baseball. They can then put their information into a Venn diagram, comparing and contrasting characteristics of the different machines to determine what they need in the project (Figure 3.5). The Venn diagram covers point "b" on the project template.

To weave technology through the process, students can use a digital camera to create their presentations. They can scan other images into the computer to create slide shows. (If schools do not provide scanners, local copy stores scan in photos for nominal fees.) Students can also use Internet sites to gather necessary information.

Once students create their presentations, they can produce a news program for another class, showing their Venn diagrams while projecting their images onto a TV monitor with a Videoloupe microscope or other projection microscope. (The Videoloupe microscope is a microvideo camera manufactured by Scalar under the guidance and research of Louisiana State University's Microscopy department.) Teachers can tape each news program and catalog it for future reference.

From task "a," students produce a list of characteristics that they use to create the Venn diagram listed as Science task "b" on the project template. Since the tasks in the project are built around Gardner's multiple intelligences theory (see chapter 1), each favors a particular intelligence, balancing the project. Performance task "a" draws on the strengths of the visual/spatial learner; performance task "b" draws on the strengths of the logical/mathematical learner. This is not to say only these learners can perform the tasks, but as cooperative groups are formed, teachers can divide these learners among the groups.

To weave technology throughout the project, teachers can list technology strands under the performance tasks for each subject. For example, under the integration of technology in science (see Figure 3.4), letters "f–h" denote the use of several different types of technology. After researching their topic on the Internet, students can use a drawing program to illustrate their simple and complex machines. *Kid Pix* (Figure 3.6) is an example of a drawing program for younger students. Older students can experiment with a graphic design program.

Teachers create the performance tasks for the project based on the standards outlined in the integrated unit, leading toward the creation of the culminating product—a finished baseball field. This product serves as the students' evidence of understanding and application of achieving the standards. The key is for teachers

Project Template

Project Title: "Where Have You Gone, Joe DiMaggio?"
Team #: Grade Level: 6–12
Teachers: Time Period:

Culminating Activity: Build a baseball field on the school campus, local park or community area.
Essential Question: How can we improve our community and build relationships?

Literature/Reading (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Science a. Identify/label/illustrate simple/complex machines and construct a set of representational diagrams (visual/spatial) b. Compare/constrast simple/complex machines (muscle use) relating to baseball and create charts (logical/mathematical) TECHNOLOGY c. digital camera d. scanned images e. multimedia presentation tool	Mathematics (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.
The Arts (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Social Studies (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.	Health & Physical Education (List Intelligence) a. b. c. d. e. f. g. TECHNOLOGY h. i. j.

Figure 3.4

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Simple and Complex Machines Venn Diagram

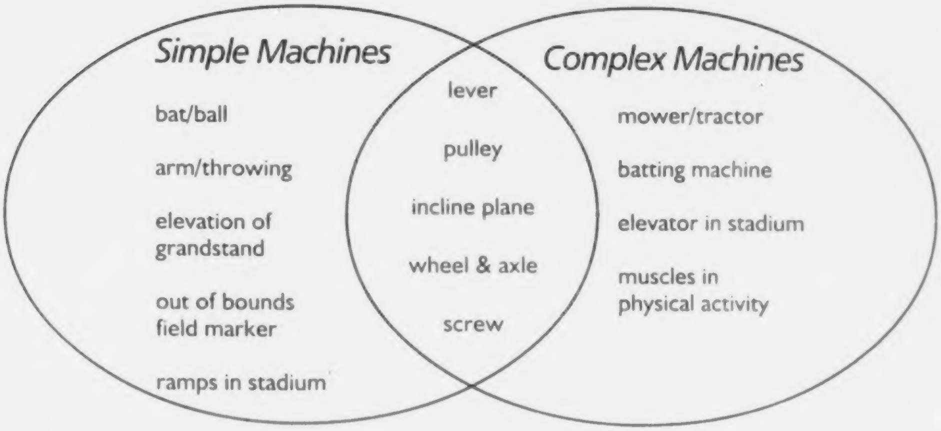
Simple Machines
Complex Machines
bat/ball
arm/throwing
elevation of grandstand
out of bounds field marker
ramps in stadium
lever
pulley
incline plane
wheel & axle
screw
mower/tractor
batting machine
elevator in stadium
muscles in physical activity

Figure 3.5

to construct learning that is meaningful while integrating cross-curriculum standards and skills.

Create Performance Assessments

Teachers can use culminating tasks as performance assessments (see Figure 3.7) within project work (Ingram 1998). Using a variety of these tasks in projects enables students with different intelligences to succeed in demonstrating their understanding.

Adjust to Project Progress

Once teacher teams place tasks, performances, and products on a project template, teachers continue working in teams during common planning time to review, revise, discuss, and gather support for the project. As the project progresses, students or teachers may decide to change or incorporate different tasks to get the job done more effectively or to achieve a better product. For example, the cost of building benches out of wood may be too expensive. It may be more cost effective to build them out of metal. This one change causes a chain reaction; students must ensure that all the supporting resources can be used with metal instead of wood.

Besides measuring for the correct amount of materials, calculating costs, and determining who can help design and build the baseball field, students need to secure permits, contact city officials, and advise the school board members before any building can take place. Local hardware stores might want to help build benches or the concession stand. A local fence company might be more inclined to donate supplies if a group of students made a multimedia presentation demon-

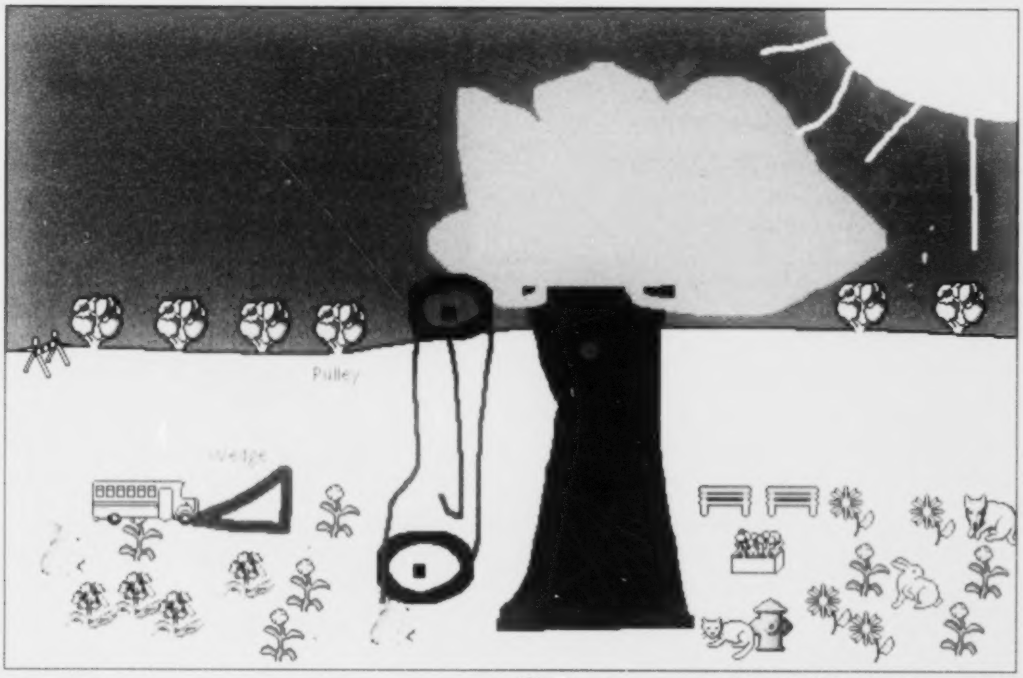

Figure 3.6

Illustration created in *Kid Pix* by Steve Ash

strating a need for their project and how it would benefit the community. Students may even find out as they go along that they need other approval to build their baseball field. The opportunities are endless!

Aligning Standards

Aligning standards detailed in the integrated unit with performance tasks and skills in the project achieves a scope and sequence across grade levels as each year's work builds on prior projects.

To ensure scope and sequence among projects and to avoid teaching dinosaurs or other popular topics several years in a row, administrators and teachers can create a project log. Aligning Standards, Skills, and Tasks (see Figure 3.8) is an example of a log entry for the science standards in the project template (see Figure 3.4).

At the beginning of a new school year, teacher teams should look at what projects the prior grade implemented during the previous school year. If last year's second grade classes worked on a project that focused on the concept of change as it relates to dinosaurs, this year's third graders should have a knowledge base of dinosaurs and could extend the concept of change into other areas such as environmental issues. Soon students begin to build whole learning strands, establishing a continuum: what is learned in one class has a relationship to what is learned in another. How many times has a teacher heard a student say, "That's what we do

Culminating Tasks for Performance Assessments

Group Presentations

competition
informative speech
demonstration
job interview
exhibit
musical rap
fair
oral presentation

Written Task Ideas

advice column
design a plan
how-to directions
magazine article
book
editorial
itinerary
outline
character sketch
feature story
journal
newsletter
comic book
guidebook
letter to the editor
brochure

Graphic Organizers

budget
graph
schematic drawing
chart
list
spreadsheet
poster
map or globe
survey
flowchart
database
table

Artistic Products

bulletin board
design model
etching
painting
cartoon
diorama
game
photo album
collage
drawing
lithograph
sculpture
computer graphics
editorial cartoon
mural
poster

Technical Products

invention
technical drawing
mathematical model
technical specification
scale/working model
food/recipe
technical manual

Electronic Productions

audiotape
news report
videotape
slide show
radio/TV ad
talk show
documentary

Computer Generated Products Using

word processing
graphics
spreadsheet
specialized program
database
Internet

Figure 3.7

SkyLight Training and Publishing Inc.

in math, but this is science class." Performances, content, process, and skills are meaningless if not viewed as an interrelated, integrated whole.

Using project-based teaching and learning with the integration of technology as a seamless component makes connections throughout the curriculum. Students then have the necessary critical thinking and problem solving skills to transfer into the workplace. Projects require students to collaborate, discover information, rely on each other, utilize technologies, and apply knowledge to new situations—all necessary skills for the real world.

Aligning Standards, Skills, and Tasks

Standards	Skills	Task
Science 1: Students should be able to solve real-world problems through scientific inquiry methods, using appropriate technology to communicate ideas and solutions effectively.	Identify basic workings of machines. Recognize characteristics of force. Make comparisons among simple/complex machines.	Identify characteristics of machines in the community. Create Venn diagrams from findings in the community.
Science 3: Students should be able to analyze and communicate similarities, differences, and interdependence of living things.	Communicate that simple/complex machines are essential to perform work.	Illustrate findings gathered from community.

Figure 3.8

Chapter 4

Implementing Projects for Real-World Learning

To integrate technology into classrooms, teachers need to make applying knowledge students learn to new situations an integral part of the learning experience. As mentioned previously, the essence of restructure is implementing a standards-based curriculum that integrates projects and technology. The process for designing quality projects through content-rich integrated units is explained in the previous chapter. Now teachers need to focus on changing the classroom into a collaborative working environment for students to accomplish their tasks. Teachers need training on how to implement and manage this new learning environment whether it is an elementary or secondary situation. As described in the school improvement plan (SIP), new strategies are changing the way teachers deliver and manage instruction. Classrooms are changing from passive, teacher-directed environments to ones where students are actively engaged in quality work and where teachers' roles are ones of facilitators and coaches.

Changing the Learning Environment

Observers walking through the halls of standards-based, project-driven schools hear and see things quite differently than they would have observed a decade ago. Many times throughout the day, students work in groups, possibly in the halls, on the floor, on their way to the library, or in a classroom reference center. Multiple tasks are taking place at the same time. At first glance, the teacher may be hard to spot. Upon closer examination, observers find teachers sitting among their students, guiding them as they make discoveries.

Changing the learning environment means adjusting the daily schedule. Depending on the project or activity, students may need larger blocks of time to complete a task and to extend the learning process. Students need time to make discoveries, analyze information, show conclusions, and reflect on their learning. When designing the SIP, the design team must consider scheduling larger blocks of time to ensure all instruction focuses on quality work for all students.

Adjust the Elementary Schedule

Due to the young age of students, many elementary schools are self-contained, which means students remain in one room for all academic instruction. Most of their day is spent with one teacher, except for support classes such as art, music, library, science, or computer lab. Self-contained classes give young students stability and security as they adjust to one teacher. As students progress through school, they can more easily adapt to changing classes and teachers.

Many elementary buildings do not lend themselves to rotating classes. Hallways are narrow, and lockers or places to store books and supplies do not exist. Some teachers do team teach. In this scenario, two teachers pair up and teach half of the subjects to both classes. For example, if Mr. White preferred language arts and reading and Ms. Green preferred teaching science and math, then Mr. White would teach language arts and reading to his own class and to Ms. Green's class. Ms. Green would then teach math and science to her own class and to Mr. White's class.

Teachers in self-contained classrooms easily adjust their schedules to cover larger blocks of time. The Self-Contained Elementary Daily Schedule (see Figure 4.1) is an example of what a schedule could look like. Teachers can modify this schedule on days when students attend support classes such as music, library, art, physical education, guidance, and computer or science labs.

To adjust to this schedule teachers must realize they can never teach every fact about every subject because the amount of information is increasing daily. As teachers prepare students for the information age, it is more important that students understand how to find and use information, think critically, apply knowledge to new situations, and solve problems.

Adjust the Secondary Schedule

Many schools traditionally deliver secondary education in six to seven separate periods with five-minute breaks in-between classes. Due to teacher certification requirements at the high school level, it is not practical to impose self-contained classrooms.

However, secondary schools can still manage to provide students with larger blocks of time for learning. Many secondary schools now offer block schedules, providing ninety-minute blocks of instructional time. Some schools create schedules that are alternating days (MWF/TuTh) and alternating weeks (A week/B week) while others use a four-block schedule (four blocks of time five days a week: language arts, mathematics, science/social studies, and an elective). For more information about block shceduling, see *Block Scheduling: A Collection of Articles* edited by Robin Fogarty (1996).

Schools without block schedules create variations of these schedules incorporating teacher-student teams in families, houses, or blocks. Placing students and teachers in teams (families, houses, or blocks) provides the foundation to enable students to extend what they learn in their academic disciplines and apply their

Self-Contained Elementary
Daily Schedule

Time	Teacher	Student
8:00–8:30	Welcome Attendance Lunch money Housekeeping chores	By pod, table, or group, "Student Daily Organizational tasks" are completed - Internet - check weather at http://www.weather.com Math Problem of the Week http://forum.swathmore.edu/dr.math/dr-math.html Journal writing
8:30–8:45	Literature Loop, reading/writing teacher models behavior	Literature Loop - reading/writing
8:45–9:15	Literature Instructional Seminar - teacher facilatates from literature in integrated unit - A balanced literacy program	Listening, speaking, reading, writing to correlate with what the teacher is teaching or demonstrating
9:15–9:45	Literature Conference teacher facilitates activities through integrated unit	Guided practice reinforcing skills taught in the instructional seminar
9:45–10:30	Writing Instructional Seminar and/or Writing Conference - teacher facilitates activities through integrated unit.	Listening, speaking, reading, writing to correlate with what the teacher is teaching or demonstrating in writing. If students participate in conference or guided practice, student will practice
10:30–11:00	Mathematics Instructional Seminar - teacher directed - instruction may correlate with integrated unit or be an isolated skill or process outside the context of the integrated unit.	Listening, speaking, reading, writing to correlate with what the teacher is teaching or demonstrating in writing. If students participate in conference or guided practice, students will practice.
11:00–11:45	Mathematics Conference teacher facilitates guiding practice	Students work in groups to practice the new mathematics skill taught during instructional seminar time
11:45–12:30	Lunch	Lunch
12:30–12:45	Organizational time/break etc.	Organizational time/break etc.
12:45–2:15	Project time - Applying knowledge across the disciplines - teacher facilitates activities. Instructional Seminars may be presented in science, social studies, art, on an "as needed" basis - teacher directed	Project time - students are actively involved in their tasks. Activities may be organized on a rotating basis. Students work in groups to apply what they have learned in the different content areas. Some teachers directed instruction may be included to give students the knowledge they need in science, social studies, etc.
2:15–2:45	Recess/P.E./Planning	Recess/P.E.
2:45–3:00	Prepare for dismissal	Reflective journal wrinting
3:00–3:15	Dismissal	Dismissal

Figure 4.1

knowledge to project work. This requires teachers in different subjects to plan integrated units and projects. Teacher teams can still teach academic content in traditional sixty- to ninety-minute blocks, but teams can flex the schedule if need be. Many schools empower their teacher teams to flex the schedule by providing a block of time (typically four hours) for core class (traditionally language arts, math, science, and social studies) and then allowing the teams to determine how to spend this core time based on instructional needs, plans, and activities. For example, the science teacher may need a longer period of time for a lab activity so the other team members adjust their schedules to allow for students to participate in the lab.

The homeroom or advisor/advisee period can also function as project time (see Figure 4.2).

Secondary
Daily Schedule

Time	Teacher	Student
7:15–9:00	Homeroom Facilitate project work	Homeroom Project work
9:00–9:55	Teach in specific content area	Period 1
10:00–10:55	Teach in specific content area	Period 2
11:00–11:55	Planning time	Period 3
11:55–12:25	Lunch	Lunch
12:25–1:20	Teach in specific content area	Period 4
1:25–2:15	Teach in specific content area	Period 5
2:15–2:30	Dismissal	Dismissal

Figure 4.2

As the design team examines the daily schedule, they need to establish lifelong learning goals for all their graduates. Most administrators and teachers would agree with Daggett (1997). Students must leave school as literate, informed, responsible, and productive citizens. Students cannot possibly learn everything they need to know in the twelve years of formal education. It is important for students to have the abilities to think critically, to work as team members, to solve problems, and to find, sort, and analyze information. Teachers need to instill a desire in students to ask how and why questions. Exposure to large numbers of disjointed curricula without opportunities to apply and make connections does not ensure students gain the necessary skills to enter the job market of the twenty-first century.

Project work at the secondary level must embrace a spiraling curriculum to fulfill the desired competencies of a high school graduate. Now more than ever, secondary teachers must work closely with corporate community leaders and higher education professors to construct units and projects that contain rigorous and relevant content ensuring students demonstrate an acceptable performance standard.

Teachers must change homeroom time from mere housekeeping chores (attendance, announcements, etc.) to a meaningful project period. Teachers can determine if students meet or exceed the content standards when applying content knowledge to new situations, behavior, attendance, quality of project assignments, ability to take an initiative and follow directions, and the ability to function as a team member.

The design team must define what types of activities should occur during the homeroom period. Since this is one period during the day when defined groups of students are together, this is a perfect opportunity for them to bring their skills and knowledge together through an authentic project. The design team makes these changes and writes them as goals in the SIP. In fact, this homeroom time becomes home base—a base of operations for students and teachers to reflect on work, the projects, and problems encountered along the way. Rather than thinking of themselves as a homeroom teachers, teachers must see themselves as advisors and facilitators for students. This time creates opportunities to guide students through the work or even in social skills development. This home base period is sometimes referred to as teacher assisted guidance (TAG) or an advisor-advisee period.

Teachers' Roles: Year One

As more and more teachers change their roles in the classroom from a disseminator of information to a facilitator, the need for professional development prior to implementation is greater. Organized chaos, the group processes that exist in project-based classrooms, takes skill to orchestrate. An observer might pass by while students are talking and walking around the room or working on the floor. At first glance, these students appear out of control. Upon closer examination, if the teacher has provided organized activities with clear directions, the observer sees students discovering and collaborating as they learn.

For this type of environment to be successful, teachers need to know how to group students, how to design meaningful activities, what amount of time to allocate, and how to develop rotation schedules so that all students have access to all resources, including technology. Teachers create this chaos by actively engaging students to work in groups and teams on their projects with a teacher manager. This is a shift from the teacher-directed classroom that requires students to be seated passively in rows of desks. This is not to say teacher-directed instruction does not take place in a project-based classroom or a quiet environment never exists. There are times when teachers directly teach skills and concepts and students work quietly, but this is not the only way students learn.

Set First-Year Goals

Before the first year begins, the design team works with teachers to assess levels of teacher understanding in technology and project-based teaching. The design team can then set goals to provide professional development (see Figure 4.3). After the design team creates the SIP, the entire faculty can review it before implementation during the fall semester. The design team then revisits the SIP periodically to assess the school's progress toward stated goals.

Professional Development Goals for Year 1

1. Form multigrade or multidiscipline teacher teams. Provide professional development to demonstrate how teachers should plan and function within a team.
2. Introduce terms of project-based instruction and provide professional development in the usage and implementation into the classroom.
3. Provide workshops on multiple intelligences and brain-based theories of how students learn.
4. Incorporate classroom management and organization within a project-based environment.
5. Use professional development to show how to set up an environment that reflects multiple tasks—how to use centers and technology to their maximum potential.
6. Introduce multiple assessment strategies: how to develop performance assessments, write rubrics, create portfolios, target student intelligences, and define options for evaluating nontraditional work (products/performances).
7. Design integrated units to ensure the curriculum is taught within the project.
8. Form partnerships among teachers, business leaders, and college professors.
9. Introduce portfolios and rubrics.

Figure 4.3

Set the Schedule for the First Year

During the first year of the SIP, design teams must plan professional development to help teachers manage and reorganize their classrooms. This training should run simultaneously with the technology training outlined in chapter 2. It is important to remember with the technology and professional training designated during each of the three years of the SIP that each topic must be repeated or reinforced in subsequent years. Just because a topic is covered in the first year does not mean it should not be repeated during the second or third years. Monthly Schedule for Year 1 (see Figure 4.4) outlines a possible schedule for professional development. The design team needs to monitor and adjust these schedules to fit their faculty.

Master Project-Based Learning Terminology

The first step in professional development training is to learn the basic terminology of project-based learning.

Instructional Seminars: time during the day when teachers convey new knowledge

Conferences: guided practice, time for students to practice what they have learned

Project Time: time for students to apply their knowledge to a real-world setting

Essential Questions (the big idea): combine concepts, facts, topics, skills, and standards to increase student understanding

Performance Tasks: a goal directed activity demanding that students bring a wide range of knowledge and skills to solve a complex problem

Rubric: an established set of criteria for scoring student work—a scoring tool

Portfolio: collection of student artifacts representative of reading, writing habits, attitudes, and interests that documents student's growth and accomplishments over time

It is essential for administrators and teachers to begin using this terminology and to communicate it to parents. It is important for parents to understand how project work is evaluated and how this translates to a report card grade. Parents may question a reduced number of worksheets coming home in a weekly packet of papers. They could interpret it as a lack of learning in the classroom. The truth is quite the contrary. Students may work on some of these types of activities; however, they are usually working toward a culminating product, performance, or exhibit that may not be visible to parents until the end of the project.

Parents may also be unfamiliar with teachers scoring students' work with a rubric. If parents are used to seeing 90s and 100s, they may be confused when their children receive a score of 4 on a piece of work. When parents understand how a score of 4 compares to a score of 100, they are more accepting of the changes. Communication is the key with any kind of change. Notes, flyers, open houses, parent-teacher meetings, conferences, and messages posted on school or class Web sites are all good ways to reach parents and explain how teachers evaluate project work and how these evaluations contribute to their children's grades.

Monthly Schedule for Year 1

August: Organize multigrade, multidiscipline teacher teams

September: Workshops on project-based instruction and terminology and on planning integrated units

October: Workshops on multiple intelligences and brain-based learning theories

November: Workshops on management for the multitask classroom

December: Teams design an integrated unit that extends a few tasks into real-world situations

January: Teams consult business leaders in the community to begin building a rapport between school and community

February: Teachers begin implementing units and project tasks

March: Workshops on rubrics; teachers begin scoring student work with them

April: Workshops on portfolios; teams brainstorm on using them next year for assessment

May: Workshops on performance assessment and multiple strategies for assessing students' progress

Figure 4.4

Teachers need to understand how to apply this terminology to integrated unit design, project work, and daily schedules. Design teams can arrange for mentoring teachers, district-level personnel, or outside consultants to teach unit design that moves students to higher levels of understanding by encompassing an essential question, or big idea, while teaching to the standards. The appendices at the back of the book provide some examples of unit designs.

Workshops

Teachers should attend workshops to acquire strategies to orchestrate group work. This begins with training students to perform short, simple tasks to move in and out of groups quickly. When students work in groups, each member needs a specific job or role. As students rotate among various project tasks, their jobs should change so all students have the opportunity to perform each job. Teachers need to learn how to arrange rooms to maximize instructional seminars, conferences, and project time. Workshops need to cover topics such as solving problems individually before collaborating among team members, monitoring teams as they work, managing materials, asking skilled questions to probe student learning, setting up centers, and practicing basic social skills when working as a team.

Mid-fall is an appropriate time to introduce multiple intelligences and brain-based learning. Workshops can focus on the work of Howard Gardner (multiple intelligences), Robert Sylwester (brain-based learning), and Eric Jensen (brain-based learning) among others. To work with different learners, teachers need a good foundation on how students process information. The design team should schedule workshops prior to performance assessment workshops. Once teachers understand how the brain processes information, they can design appropriate assessments for all learners to demonstrate student understanding of a concept or skill. Understanding the different ways students learn is critical to determining how and why multiple assessment strategies need to be used to evaluate student progress.

If available, teachers can bring support teachers (librarian, music, science lab, computer lab, art, physical education, foreign language) into the room to help small groups of students at a particular center. A computer lab teacher could come into a regular classroom while students are working on a PowerPoint slide show for an upcoming presentation. Students may have a basic understanding of the software program, but lack the skill to organize and design their slides. While the classroom teacher works on skills or concepts with one group of students, the support teacher can lend expertise in the area of technology. Other students may go to the library for research or to the computer lab to work on a particular task. Any time parents have a skill they can share or just time to lend an extra hand during an activity, teachers need to welcome them with open arms.

As Oak Forest School began construction of a nature trail on the northeast corner of the campus, teachers asked parents to help clear the land. Groups of parents from all classrooms gathered on several Saturdays to clear poison ivy, dead trees, and brush prior to allowing any students to begin work. One parent turned out to be the manager of a national home building supply store that just opened nearby. He was instrumental in helping several classes build an outdoor classroom.

Regardless of how students form groups, teachers need to organize groups around different intelligences giving each group specific directions prior to beginning the task. If teachers follow these steps, most of the time students behave appropriately and stay on task. For those who just cannot cooperate, loss of privileges to work with the group can persuade students to change their behavior.

Design Integrated Units

Toward the end of the first semester, teachers need to begin designing integrated units (see appendixes A, B, and C for example units). Teachers plan within their teams to decide how to begin implementing a unit in a self-contained classroom or how to coordinate the teaching within separate academic periods. Teachers need time to brainstorm with other teachers to see what works best for their students. Monitoring and adjusting take on new meanings once teachers fully implement project work. Teachers need to focus on reflection during ongoing rap sessions either across the hall or during team planning time. "It would work better if next time we . . . ," or "This lesson would have more meaning if . . . ."

Teachers can invite business leaders from the community to the school for open sharing and brainstorm sessions. This builds a partnership to strengthen the connection between education and the workplace. Many schools already have corporate sponsors, but many of these sponsors don't know what schools need except for computers and money. Schools need to take the lead to encourage and guide businesses on how to provide other resources to the school. Corporate managers can help teachers with time management, team planning, project management, or production schedules. These indirect resources are easy to supply and usually only involve a time investment, but teachers often overlook them.

Introduce Performance Assessments

Teachers need to familiarize themselves with the concepts of rubrics and performance assessments toward the end of the first year. Design teams can encourage teachers to begin using these strategies in the classroom, but they should not make high demands at this point. During this first year of the SIP, teachers should only try to extend real-world tasks or project work on a limited basis. This new learning environment needs to begin in small chunks to keep projects relevant and rigorous and not fun, fluffy work.

Teachers' Roles: Year Two

The design team needs to extend professional development from the first year into the second year. The design team needs to evaluate the level of teacher understanding in the areas of standards-based instruction, integration of technology, integrated unit design, and performance-based assessment as year one comes to an end. Then they can accurately set goals for the second year of the SIP.

Set Year Two Goals

As stated previously, but worth repeating, teachers must always try to review, repeat, monitor, and adjust any or all of the topic workshops covered in the first year. It is important for teachers to have a good understanding of how to plan integrated units and project work as they begin the second year of restructure. Again, the design team plans technology and professional development workshops for the second year with input from the teacher teams. Professional Development Goals for Year 2 (see Figure 4.5) is an example of how the design team can map out the professional development for the second year of the SIP.

Professional Development Goals for Year 2

1. Monitor team planning to ensure scope and sequence among projects.
2. Align standards and skills taught in project work to state achievement requirements and various industry standards.
3. Address multiple intelligences and incorporate them into project work.
4. Provide professional development on standards-based instruction.
5. Strengthen literacy through reading and writing workshops.
6. Design rubrics and practice scoring student work.
7. Examine performance tasks—what they are and how to use them in project work.
8. Incorporate portfolios—how to set up and manage, evaluate the different kinds, and use them effectively with parents.
9. Provide professional development for team project planning, organization, and time management.
10. Introduce software to strengthen skills and content in different curricular areas.
11. Examine peaceable school strategies.

Figure 4.5

As noted in the example (see Figure 4.5), the design team lists a couple of topics from year one again in year two. The design team should review the integrated units and project tasks each team plans to implement during year two, cataloging concepts and topics studied to ensure a scope and sequence among projects from grade to grade. If teachers feel comfortable placing performance tasks on the project template as discussed in chapter 3, they could do so, but design teams should not make it mandatory until the third year. At this point any real-world or authentic connections that teachers can make to tasks in project work are sufficient.

Set the Year Two Schedule

Teachers need to view the second year as a building year. Some teachers may still feel unsure with these new teaching methods and feel they may need to review training from the prior year. The school may have also hired new teachers. Hopefully there are enough faculty members to mentor and lead some review sessions. The design team needs to give these teachers careful consideration when writing the SIP for year two. They should evaluate the level of teacher understanding of the new strategies so benchmarks and goals are attainable. Monthly Schedule for Year 2 (see Figure 4.6) provides an example of a possible schedule for professional development training sessions.

In the second year, teachers need to focus workshops on rubrics, reading and writing connections, performance tasks, and technology.

Attend Workshops

If possible, schools can invite specialists from the state department or the district's standards office to conduct workshops to lead teachers on teaching to the standards. Teachers also need to take time to explore the standards documents developed by subject field leaders such as National Council of Teachers of Mathematics (NCTM), National Science Teachers Association (NSTA), or National Council of Teachers of English/International Reading Association (NCTE/IRA).

Rubrics

During the first year of professional development training, workshops introduced teachers to rubrics as a scoring tool. Now they need to practice designing rubrics with their students, allowing them to help develop the criteria for their work (see chapter 1). When students know what is expected of them, most of the time they will try to attain high achievements.

Teachers can use a resource like the Tennessee Online Writing lab <http://utk-stec.admin.utk.edu> to practice their scoring ability against that of the experts. Since writing is a natural performance, it is a great place to begin using rubrics.

By the end of the second year, it is feasible to require all teachers to use a rubric with at least one assignment in each discipline and begin communicating

Monthly Schedule for Year 2

August: Organize teacher teams; teacher teams design units and project tasks

September: Workshops on the use of national, state, and district standards

October: Workshops on how to design and score with rubrics; teachers establish criteria for portfolios

November: Workshops on how to strenghten literacy

December: Workshops on how to design and use performance tasks in project work

January: Workshops on Accelerated Reader

February: Workshops on Reading Renaissance

March: Workshops on Wiggle Works

April: Teams brainstorm ways to improve classroom management

May: Teams reflect on progress made in the second year and begin planning for the third year

Figure 4.6

these scores to parents. It is important that administrators and teachers decide how to incorporate rubric scores into the students' grades as further discussed in chapter 5.

Reading and Writing Connections

Workshops to strengthen the reading and writing connection strengthen the integrated unit and project design. Depending on the grade level, teachers can introduce a variety of approaches to include shared reading, reading to students, guided reading, independent reading, shared writing, and responses. Teachers can use literature, such as *People of the Rainforest* by Lynn M. Stone, to examine different perceptions regarding people who live in a rain forest by people who live elsewhere.

A literacy program needs to foster a love and enthusiasm for reading and writing at all ages and to introduce a variety of story structures, genres, characters, authors, and illustration styles. Teachers must learn to provide models across the curriculum for writing and learn about the writer's craft, making this an integral part of project work.

Performance Tasks

Professional development on the design of performance tasks embedded in project work establishes the criteria of evaluating what students know, understand, and can do in authentic situations. Teachers must look at what standards they need to teach, determine the performance criteria they want students to reach as a result of this task, then design activities around instruction allowing students to demonstrate their understanding in project work. This is where everything starts to come together. However, year two should still be thought of by the design team as a transitional period. Monitoring, adjusting, revising, and brainstorming set the stage for a strong third year with all pieces in place.

Prepare for the Last Year of SIP

Toward the end of year two, teacher teams can begin brainstorming strategies to implement a peaceable school program during year three. This program is implemented to resolve conflict in a nonviolent manner. The design team can write a peaceable school goal into the SIP with strategies to help students handle differences. Peer mediation is one method that works well with upper elementary students through high school. Teachers, counselors, and administrators select a group of students to receive peer mediation training. This training helps the selected students listen and make decisions when cases come before them. If a conflict arises among peers, students may choose to have the peer mediation team decide the consequences. Students must agree beforehand to abide by the decision of the peer mediation team.

Teachers' Roles: Year Three

As year three begins, teachers review the guidelines for preparing a project template as detailed in chapter 3. They can then post a copy of the template in each classroom for students, parents, and visitors and file a copy with the administration. Business and higher education leaders can review these templates to ensure teachers are addressing skills that students need beyond graduation.

Teacher teams can use a check sheet (see Figure 4.7) to monitor their planning time to ensure they are conducting all activities. Each team member should have a copy of the check sheet. This type of check sheet helps teachers monitor their own teamwork skills and ultimately helps them teach these skills to their students during the project-based lessons.

Set Year Three Goals

By year three, teachers and students are more comfortable with the new teaching and learning strategies and with the use of technology. During the coming year all the parts of the restructuring initiatives begin to fall into place. Teachers move into true integration. The design team can assess teachers at the end of year two to determine the level of expertise among the faculty. This helps the team to plan goals for year three (see Figure 4.8) that outline a plan for professional development and areas of concentration to ensure students are producing quality work. Since reading is the basis for all learning, much of the third year focus provides balanced literacy and requires students to take more responsibility for their learning.

Set Year Three Schedule

Once the goals are set, the design team can easily set the schedule for the final year of the SIP. Figure 4.9 outlines a possible monthly schedule for the third year of restructure.

Consult a Peaceable School Specialist

As mentioned at the end of year two, schools should try to bring in a peaceable-school specialist toward the beginning of the third year to help the counselor and teachers implement a conflict resolution program to aid in classroom management. A peaceable school specialist is someone trained in conflict resolution. This specialist could be a district level person or someone brought in to help train teachers and students to resolve conflict without resorting to violence. If this is not an option, the school guidance counselor can research the topic and facilitate the training. For many schools this person might be the school psychologist or social worker who can lead counselors, teachers, and students not only in devising a planned program of conflict resolution but also in creating a team of student peer mediators who can assist in problem solving and social skills development. Often local colleges and universities through colleges of education provide this type of support if local districts do not have these in-house services or specialists.

This helps teachers during project time as students move about in classrooms. When students solve their own conflicts, they feel a sense of ownership and become responsible for their actions.

Report of Team Planning

Team Name or No. ________________ Date ____________________

Team Members Present:

_____ Planning process among all members reflects constructive team planning strategies.

_____ All team members effectively address standards while planning units, project work, performance tasks, rubrics, etc.

_____ All team members participate in the designing of tasks or activities to lead toward answering the project's essential question.

_____ Appropriate assessment instruments are designed with the different intelligences and brain-based learning theories in mind. Teachers are including opportunities for students to become part of the assessment process where applicable.

_____ Team is utilizing resources of the science lab, computer lab, and/or any support teacher when planning project work.

_____ Secondary teachers or teachers who teach one subject are planning activities that encompass all disciplines in project work that the student is studying.

_____ Team is utilizing resources of the community and/or school adopter in the planning of project work.

_____ Team is on task throughout the planning period.

_____ Goals for the next planning time are discussed and agreed on prior to adjourning.

_____ Team leader disseminates housekeeping information passed down from the administration.

_____ Each team member performs his or her job during planning time.

Strengths exhibited: Areas of need:

Figure 4.7

Professional Development Goals for Year 3

1. Monitor team planning and require teachers to post project template in classroom.
2. Implement a peaceable school program with peer mediation.
3. Implement software programs to provide balanced literacy in project work.
4. Focus on reading and writing connections through a balanced literacy program. Require that students receive at least 30 minutes per day of silent, paired, or shared reading.
5. Display student work throughout the school to meet criteria ensuring it represents quality.
6. Provide professional development in the design of performance tasks and how they are used to assess student performances.
7. Establish criteria for what should be included in a student's portfolio. Require portfolios to be used in parent conferences.
8. Use a report card insert to communicate student performance in project work.
9. Provide professional development to strengthen science and mathematics instruction.
10. Communicate new or additional forms of reporting student progress to parents.

Figure 4.8

Establish Portfolio Criteria

During the second year of reform, teachers established portfolio criteria and used them on a limited basis. In the third year, teachers set more detailed guidelines for portfolios (see chapter 5), and administrators can monitor portfolio use during parent conferences or an open house where students display their work.

Teachers need to establish portfolio criteria to avoid setting up a folder and randomly storing student work or storing so much it becomes unmanageable. Portfolios should show student growth. Portfolios represent the ability of students to demonstrate their level of understanding and to what degree they have met or exceeded the standards. Since many student artifacts can be multidimensional, portfolios are a way to assess and display them. Teachers can attach reflection papers to allow students an opportunity to explain what they have learned and why. Instruction that is based on the premise of asking "What should students know, understand, and be able to do?" requires that students participate in some

Monthly Schedule for Year 3

August:	Workshops on how to complete the project template; teams set guidelines for portfolios
September:	Workshops on a peaceable school program
October:	Workshops on Accelerated Reader, Reading Renaissance, Wiggle Works
November:	Teams implement an observation checklist and set up a drop-everything-and-read time
December:	Workshops on balanced literacy
January:	Workshops on how to strenghten science and mathematics instruction
February:	Workshops on how to strenghten science and mathematics instruction
March–April:	Teachers communicate new forms of reporting student progress to parents
May:	Teams reflect on year three and begin making plans for the next school year

Figure 4.9

type of project or performance that demonstrates not only their knowledge but includes understanding and application of what they have learned. The use of student portfolios to showcase their best work or to document their work in progress or as a process is a means of both assessment and project work.

Maintain Balanced Literacy Program

As teachers extend the balanced literacy program into year three, they can include a mandatory drop-everything-and-read time. Teachers can vary the length of time depending on the grade level. Teachers, aides, administrators, and office personnel should also drop what they are doing and read. Modeling this behavior throughout the school reinforces the importance of reading to students. Teachers need to move away from the "Don't do what I do, do what I say" philosophy. Teachers can also reinforce a reading connection by sending home tips and suggestions for how parents can read with their children. Teachers can post these tips and suggestions in the classroom or on a school home page. Some of the tips teachers can provide include keeping children well rested, making sure they receive plenty of healthy foods and maintain good attendance, providing open communication on a daily or weekly basis, checking homework, and using the Internet to see what is going on in the classroom.

Students' abilities to create projects, performances, and portfolios rest with their ability to read, respond, and interact with text. A balanced literacy program that provides students opportunities for engaging in reading and writing practices allows students to produce quality project work. Such a program that leads students from being dependent readers and writers (dependent on the teacher) to independent readers and writers builds student capacity to create projects or responses to what they have read and learned.

Make Classroom Observations

As administrators begin classroom observations, they need to look for critical factors embedded in project work that relates to reading. These critical factors are simply the components of a balanced literacy program: read alouds, shared reading, guided reading, independent reading, and writer's workshop. Administrators need to see the following:

- Teachers and students responding to text with talk, art, writing, and more reading
- Evidence of literacy-based projects as classes create big books, newspapers, journals, letters, charts, word banks, and so on
- Teachers engaging in ongoing assessment of students and their work as students provide responses (writing, portfolios, projects) that suggest real, authentic responses for reading and writing

Teachers need to be aware of these critical factors while setting up project-based instruction. These factors are critical because if students cannot read, they cannot function in other subjects. The following is a list of observable critical factors during the elementary, intermediate, and secondary school years.

Elementary

- Students engage in reading and writing experiences
- Students display an awareness of phonemes (the sounds of language) by using and talking about rhyming words, initial sounds, etc.
- Teachers, aides, or volunteers read to students throughout the day

- Teachers guide students to compose text and act as their scribe
- Teachers provide a print rich environment in classrooms (books, posters, word walls, pictures, illustrations, items labeled throughout the room, etc.)

Intermediate

- Students spend more time each day reading whole texts rather than receiving reading instruction
- Students read narrative stories and expository texts, rather than isolated sentences or words on a worksheet or in workbooks
- Teachers provide multiple strategies to help students decode unknown words in the text (phonics, context, illustrations, prior experiences)
- Teachers observe how students read

Secondary

- Students read with fluency
- Students self-correct to gain meaning
- Students read silently to themselves or read with partners
- Students independently solve problems while reading for meaning
- Teachers select and introduce new text and provide little or no support as students become independent readers and writers

Once students progress through these phases they need to spend large amounts of time reading real text not just instructional materials. When someone visits a K–12 classroom, he or she should go away with the feeling that all of the students are immersed in good literature at their appropriate reading level and that the majority of the classroom time is allocated to reading rather than learning how to read.

Teachers can use an observation checklist (see Figure 4.10) to ensure they are exhibiting all the necessary critical factors. Administrators can also add such a checklist to the district's traditional teacher evaluation. Since traditional evaluation forms do not address some aspects of a classroom environment hosting projects, this form gives a comprehensive look at how the teacher implements project work and reform strategies.

Foster Parent Communication

Teachers need to explain to parents what portfolios are and how they will use them to assess students' project work. The key to a successful change in the method of reporting student progress is communication. Small changes over a longer period of time are easier for parents to understand. Teachers can send parents assessment inserts with report cards or districts can devise narrative report cards.

Observation Checklist

Teacher's Name ________________ Grade/Subject ___ Team No. ______
Observation No. ____ Observation Date ____________________
Topic/Focus of Lesson ________________________________
Essential Understanding: ______________________________
Standards: __________ Performance Criteria: _________________
Skills Addressed: _____________________________________
State Skills Addressed: ________________________________
Technology Used Appropriately: __________________________
_____ Lesson Presentation _____ Internet ____ Research ____ Word Processing
_____ Reinforcement
Instructional Delivery: Whole Group: ____ Centers: ____ Combination: ______
____ Topic or focus of lesson observed as stated in project plans
____ Skills observed as stated in project plans
____ Standards and project template identified and displayed in classroom
____ Students are clearly aware of the particular standard(s) the project is covering
____ Performance tasks or activities provide practical application of standards
____ Evidence of how standards are measured is evident in the instruction
____ Essential question is clearly visible
____ Activity or task leads toward essential understandings
____ Activity or task leads toward culminating product or performance
____ Students are clearly aware of and/or participate in the development of rubrics or other assessment instruments
____ Teacher has designed tasks that address multiple intelligences and brain-based learning.
Specifics: ______________________________
Assessment strategies observed: ____ teacher tests ____ checklists ____ rubrics
____ multiple choice ____ essay writing

Teacher's activities during the observation:

Strengths exhibited during observation:

Areas of need exhibited during observation:

Teacher comments:

Evaluator comments:

Evaluator signature: ________________ Date: _____________

Figure 4.10

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If schools have flexibility in the design of their report card, a narrative report card may be the answer. A narrative report card gives parents a comprehensive look at their children's progress. More information is reported than just a letter or numerical grade. Explanations regarding processes and progress made during the grading period are included. If the school is locked into a traditional report card format, teachers can add a inserts to explain students' progress toward meeting or exceeding a standard level of performance. An insert might contain a list of the standards, and the teacher can mark whether a student has met the performance indicators for the particular grade level or if more practice is needed. Either way, teachers need to communicate any change as soon as possible so parents are not surprised.

Reflect on the Final Year of the SIP

As the third year draws to a close, administrators, teachers, and the SIP design team need to reflect on the progress made during the past three years. Hopefully, state achievement scores are on the upswing, quality work is displayed, and students are interacting with curriculum and instruction. Restructure is an ongoing process that begins with a seed of knowledge and is nurtured throughout the K–12 experience. Students have so much potential talent to develop they deserve the best efforts of all instructional leaders: teachers, administrators, and parents.

Chapter 5

Assessing Technologically Sound Projects

In chapter 4, teachers learned how to create a learning environment where students are not limited to completing workbook pages or memorizing facts but are required to use critical thinking skills and discover solutions to real-world problems. The final step in the three-year school improvement plan (SIP) is for teachers to implement new assessment strategies. Assessment is the process of gathering information about students: what they know and are able to do (Hart 1994). Just like the project-based instruction, assessment methods need to correspond to real world experiences. As teachers start integrating project-based lessons, they must reevaluate assessment strategies to suit the project work. In many cases, technology provides the medium for these new assessment strategies.

Assessing Student Performance

Now that teachers have learned how to successfully develop and carry out the three-year SIP, they must turn their attention to integrating the components of school restructure into assessment to report what goes on in the classroom on a daily basis. One way to do this is to create a paradigm that links all components of school restructure to assessment (see Figure 5.1).

As schools restructure their learning environments, all components (standard units, projects, portfolios, report cards) must link to what students understand and can do. In the past, assessment focused on what teachers were teaching in the classroom and not on what students were actually retaining. This diagram (see Figure 5.1) illustrates how teachers need to link all components and assessments together.

In most states, teachers measure students' abilities with state mandated achievement tests. With the integration of the SIP and project-based instruction, teachers must weave performance assessments throughout the instructional process to measure students' understanding of concepts taught during standards-

Paradigm for Integrating the Components of School Reform into Assessment

Components	Assessments
Standards	State and National Tests Performance Assessments
Integrated Unit	Topical Theme Conceptual Theme Essential Understanding Guiding Questions Processes
Project Work	Performance Tasks Technology Multiple Intelligences
Portifolios	Work(s) in Progress Showcase Digital
Multiple Assessments	Rubrics Teacher-Made Tests Performance Assessment Observations Checklists
Report Cards	Standard Assessment Insert Narrative/Anecdotal

Figure 5.1

based integrated units and reinforced in project work. Teachers can use multiple forms of assessments such as teacher checklists, teacher observations, peer or self-reflections, demonstrations, performances, essays, state achievement tests, or multiple choice tests to have students explain and justify tasks related to their learning. As teachers align these results with standards and norm-referenced achievement tests, they discover which instructional strategies to continue using to ensure optimal student growth.

Teachers not only use performance tasks to measure student understanding but also to drive instruction. If a teacher asks students to display the results of their rain forest study using a PowerPoint presentation, the task of creating the presentation requires students to know concepts and content about the rain forest as well as the technology skill needed to create a PowerPoint presentation. Teachers can't always measure technology skills with a paper and pencil test. Teachers can observe how students make slide layout decisions, why students choose certain colors, and how students organize information. As teachers observe students at work, they need to gauge if students are ready to proceed or need to review certain skills to complete their tasks.

Teachers use a variety of strategies to assess what students know, understand, and do. Performance tasks, as well as pencil and paper tasks, can be used daily, weekly, and/or monthly. Products, projects, and portfolios can be used to show student growth and proficiency over time (monthly, semester, year).

Teachers can use portfolios as part of a student's grade. The type of portfolio, showcase or work in progress, determines how it is used for the report card. Work in progress is just that—work that students need to revise, first drafts, or work students may want to change. Teachers probably wouldn't want to include this work in a final report card grade. A showcase portfolio displays final products. These are good portfolios for teachers to include when determining a final grade.

Use Multiple Forms of Assessment

Assessment is what takes place on a daily basis in all classrooms. Teachers must use assessment to help students improve their work and show their understanding through technologically sound projects. Teachers can use multiple strategies to help students work toward their goals. Simmons and Resnick (1993) state what is needed is a performance system incorporating standards with rubrics. This type of assessment provides students with feedback to guide them through learning. Many teachers think paper and pencil tests are the only means of measurement; however, teachers can use other tools such as portfolios, exhibitions, demonstrations, observations, checklists, and performance assessments to ensure success for all students.

According to Gardner, students learn differently based on their intelligence; therefore, teachers cannot base their evaluation of student work on one form of measurement (Gardner 1991). As the information age expands, brain research continues to give educators insight on how the brain learns and processes information (Sylwester 1998). Educators cannot afford to continue to measure progress with one form of assessment; it gives an unfair advantage to students who happen to perform better on the particular type of test. The same principle holds true when one tries to place a square peg into a round hole; the square pegs are out of luck. Since the task favors round pegs, they fit better and successfully complete the task. This creates an unfair evaluation for the square pegs.

Performance Assessments

Gardner (1998) suggests that teachers use multiple intelligences menus as assessment options for students to demonstrate what they know and can do. Students can choose from a list of products and performances (see Figure 5.2) that best suit their learning style. Teachers can then determine specific criteria for each product and performance.

Many teachers find that as they develop assessment tasks for project work, the assessments influence instruction. For example, a class from Oak Forest School began researching on the Internet to find wildflowers that are native to the west Tennessee area. The purpose for this research was to plan what types of flowers students should plant in the wildflower garden on the nature trail. As students began writing their planting recommendations, the teacher realized that the students needed further instruction on grammar usage and punctuation. The teacher changed instruction to correct this problem. The next week the third grade teacher retaught sentence structure and punctuation instead of moving into the next area of grammar.

The use of performance assessments allows students to demonstrate both proficiency and understanding. McTighe's (1996–1997) criteria for designing tasks is an excellent guide when teaching for understanding:

Establish Clear Performance Targets: Clarify what students should know, understand, and be able to do as a result of instruction. Consider Gardner's (1991) principle of understanding as the primary focus of teaching, defining understanding as the ability to apply what is learned to new situations.

Strive for Authenticity in Products and Performance: Require students to use and apply knowledge and skills in such a way that understanding reflects a real-world application.

Publicize Criteria and Performance Standards: Share evaluation criteria with students in the beginning to let them know the quality and standard of performance that is expected.

Provide Models of Excellence: Encourage students to look at concrete examples of work that represents the different criteria as scored by a rubric, a scoring tool to measure student performance. A rubric provides clearly stated criteria and expectations for performance and assessment. As performance tasks become more open-ended, the need for duplication decreases since students can take more than one approach to generate an appropriate response.

Teach Strategies Explicitly: Model several strategies students can use to accomplish the tasks. As the saying goes: There is more than one way to skin a cat. Depending on a student's previous learning experiences and brain growth, exposure to the world provides a neural farmland, or database of information to which one can refer when

Multiple Intelligences Products and Performance Tasks

Verbal/ Linguistic	Conduct an Interview	Create a TV news show	Debate the topic	Tell a story	Write a play
Logical/ Mathematical	Perform an experiment	Explain a concept through an analogy	Create a mathematical problems centered around topic	Describe the pattern formed by concept	Sequence events or activities
Bodily/ Kinesthetic	Create a sequence of movements to demonstrate a concept	Creat tasks on a storyboard	Build a model to represent a concept	Plan a field trip	Classify objects
Visual/Spatial	Recreate a scene from a play	Prepare chart, map a concept or graph	Create a brochure	Illustrate through paint, clay, drawing	Create a collage
Musical/ Rythmic	Add music to a presentation	Compose a musical piece to represent a concept	Uses musical tunes to play "Who Am I?"	Incorporate an instrument into a presentation	Write a rap song
Interpersonal	Solve a group jigsaw puzzle	Collaborate on taking tests	Collaborate on project posters	Peer coaching through an activity	Use Think/Pair/ Share activities
Intrapersonal	Add anecdotal card files	Use logs and journals	Create independent contracts	Hold individual conferences	Report through a photo essay
Naturalist	Take field trips	Explore nature through walks	Display a field study	Categorize things in nature (rocks, shells, birds)	Observe skies and stars

Figure 5.2

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assimilating new information into the brain, as researched by Jensen (1998). As the brain develops, different intelligences require teachers to give students choices in the strategies they prefer to use when performing a task. Much like the different developmental stages discussed by Piaget (Mussen 1970), teacher strategies need to change as the brain grows and develops. For example, a learner in the concrete stage of development may learn better through visual learning.

Use Ongoing Assessments for Feedback and Adjustment: Use ongoing assessments to identify strengths and weaknesses. This gives students continuous feedback and time for reflection to improve their products or performances along the way instead of waiting until the very end for one final grade.

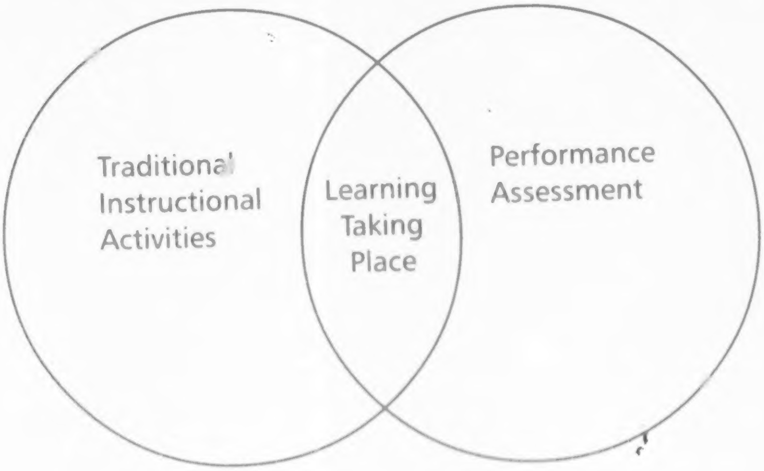
Document and Celebrate Progress: Collect artifacts in the form of portfolios and share students' progress toward achieving standards to direct attention to what students can do and how they have improved along the way. Documenting the process and progress students experience helps to shape curriculum and instruction to increase student understanding.

Traditionally, teachers use direct instruction to teach lessons in isolation and then give students tests at the end of the lesson to see what they could memorize. With project-based instruction, teachers can assess projects through products and performances and allow students to demonstrate their understanding of what they know and are able to do. This type of assessment enables educators to see if students meet or exceed standards.

Teachers need to focus somewhere in-between traditional instructional activities and performance assessment—to where the actual learning takes place (see Figure 5.3). Traditional instruction concentrates on teaching activities, lecturing, and completing worksheets. With project-based instruction, the focus shifts to what students can demonstrate, what they can do with the information they have acquired. The goal is the intersection resulting in the learning acquired by students. Integrated units extended through project work focus on what students understand.

Portfolios

Students can assemble artifacts that result from project work into a portfolio. As mentioned previously, portfolios can take different forms. Some teachers use work-in-progress portfolios as a kind of holding bin where students store just about everything they read or write in class. Others have students keep showcase portfolios that include a small number of their very best reading and writing activities. Portfolios should include a wide range of student work, including typical and best work.



Current Focus of Instruction and Assessment

Figure 5.3

Students develop portfolios of their work, including essays, reader's responses, notes, completed assignments, projects, drawings, lab reports, field notes, word problems, research data, proofs, graphs, tests, or selections from their learning logs. Periodically, students review and update the contents of their portfolios and write about how these materials show what they have learned and what they want to pursue in the future (Language and Learning across the Curriculum Committee 1997).

As part of their portfolios, students maintain learning logs or ongoing journals in which they record frequent observations about their learning (Language and Learning across the Curriculum Committee 1997). In secondary schools, students may focus these observations on the learning in a particular content area. Students may use these logs to look back at their learning over time to discover what helped or hindered them and to develop more effective learning strategies and goals for the future.

Using portfolios, students collect more than a diverse body of finished work. In fact, they gather what some call biographies of works—a range of works and projects and reflections on these works. A biography of work reveals the different moments that underlie the production of any major project such as notes, diagrams, drafts, and final versions. This range of works shows the diversity in what students do. Reflections allow students to act as critics, reflecting on the characteristics of their work and evaluating what they changed or what they still need to improve.

In addition to work in progress and showcase portfolios, other types of portfolios include the following:

- Documentation Portfolios, which are descriptive in nature, showing student progress over time
- Process Portfolios, which contain drafts, revisions, edits, and final versions
- Evaluation Portfolios, which collect student scores over time
- Composite Portfolios, which hold self-selected best work and collected scored papers, reflect attitudes, and exhibit works in progress

To become adept at thinking and reasoning, students need practice in solving real problems and comprehending complex tasks. Teachers need to redesign assessment tasks to more closely resemble real learning tasks. Portfolios do just that, allowing students to show coherence of knowledge, problem solving, and demonstration of skills.

Implementing portfolio use in the classroom requires teachers to establish a plan for use. Such a plan should consider the following steps:

1. Begin with desired outcomes.
2. Select a model.
3. Plan for implementation, management, and use.
4. Determine the types of artifacts (student work) to include and the standards to address.
5. Establish a shared philosophy, purpose, and procedures with students and their parents.
6. Provide models, instruction, and teacher support.

Ongoing assessments lead teachers to determine what criteria they can use to identify quality work. Teachers need to base decisions about instruction on a variety of formal and informal assessment strategies that move beyond the exclusive use of objective measures to include observation, portfolios, and performance assessments (NCTE 1997).

The use of portfolios as an assessment tool lies in the integrity and validity of the information gained and manipulated by the student. Portfolios allow students to take personal responsibility for demonstrating what they know. They show the learning process, not just an end result. For the teacher, the portfolio enlarges the view of what the student has learned, reflecting a range of diversity. It provides a place to show the student's process from beginning to end—a developmental point of view, in essence, providing a personal history against a backdrop of new and previously learned material.

Figure 5.4 illustrates different components of a student's work-in-progress portfolio. During the year, students need opportunities to select what they think is their best work. Teachers, peers, or parents can offer guidance.

Components of Student Portfolio

Project Focus Folder

Completed by end of first semester

- one integrated project
- Multiple subjects represented (math, science, social studies, language arts, fine arts)
- Reflective Summary written by the child at the end of project work or at the end of the semester.
- Rubrics

Project Focus Folder

Completed by end of second semester

- one integrated project
- Multiple subjects represented (math, science, social studies, language arts, fine arts)
- Reflective Summary (written by student at the end of project work or at the end of the semester)
- Rubrics

Special Pieces Folder

Selected by child/teacher/ peer ←

STUDENT PORTFOLIO

→

Digital/Electronic Portfolio

Implement software to store artifacts and house portfolios online or on stand alone computer

Interest Folder

- Reading/Writing Goals (examples: goal setting forms, interest survey)
- Accelerated Reader and any other student reports of progress

Electronic Folder

(Could keep this in a resealable plastic bag in portfolio)

- Audiocassete (record child reading in September and at the end of the year)
- Computer disk (lab and/or classroom work).
- Video (record oral presentations, performances, demonstrations, and product construction)

Time Line for Student Portfolios

January:	Project Focus Folder for first semester must be completed
February:	Prepare portfolios to use at parent/teacher conferences
March:	Portfolios completed for math/science/technology night (students lead showing with parents)

Figure 5.4

An Oak Forest class created a Kid Pix slide show as part of a portfolio. The portfolio depicted what a nearby nature trail would look like in each of the four seasons of the year. The class used the Internet to conduct whole group research on fall, library reference books to discover changes animals go through to prepare for winter, and CD-ROMs to see how trees and plants wake up in the spring and grow in the summer. This slide show (four slides) became part of each student's portfolio. Paper and crayon pictures, storyboards, and weather words written by students all became part of the portfolios as well to show the process students went through to create their finished product.

Secondary students can easily create very detailed slide shows including spreadsheets, databases, illustrations created in a graphic design program, etc. They can also use these programs along with word processing programs to create research papers, proposals, student newspapers—the ideas are limitless.

Integrate Technology

As the use of portfolios grows, teachers realize storage and management of all this work is becoming a problem. How will portfolios move with a student from grade to grade or school to school? Administrators and teachers look to technology as a possible solution.

Digitizing information including standards, integrated units, student work, rubrics or scoring guides, individual student data, and performance tasks is the answer to this problem. With the development of district Intranets the possibility of storing information online with password protected access is more of a reality every day.

Create Electronic Portfolios

Students can create electronic portfolios using Web page software. Whole class or individual pages can display student work: a list of books read, along with student reactions, project work, or a short bibliography depicting special interests or hobbies. Students can scan artifacts or import them into the software and use hotlinks to take viewers to important resources that support the work. This gives students a chance to publish work in a real-world setting. Parents can also see what their children are doing in school, strengthening the home-school connection.

Planning Ahead

Planning ahead is the key to a successful and useful portfolio using any portfolio system, whether student work is digitized or stored in a folder or a pizza box. Teacher teams must determine if the portfolios will contain artifacts from all subject areas or if they will be limited to one or a couple subject areas. Teachers must also coordinate the process to ensure student work is collected, input, and organized. Since this is primarily a visual representation of work, students may want to seek advice from the art teacher regarding design and layout to include models, collages, or writings.

The number of computers in the classroom dictates how teachers manage the development process of the electronic portfolio. Students may need to work in small groups and on different phases. Some students may select artifacts to include and write their reflection pieces while others are planning the layout. Another group can gather work; others can input work via a scanner or digital camera. Still others can design at the computers. Students can then rotate, much as they do when they are working in centers or learning stations (see chapter 4). If the school has a computer lab, students can do preliminary work in the classroom to ensure all computers are used efficiently during lab time.

The design team needs to decide on a master plan for the use of electronic portfolios. The following are several questions the plan needs to address:

- Will students continue adding to their portfolio as they move from grade to grade?
- What will be the end use of the portfolio?
- Is there a plan for future storage needs as the information grows?
- Is there a back-up plan, and what kind of device is needed for storage: zip drive, jazz drive, server?
- How can information be transferred to other locations?
- If students create or input work at one computer, how can they transport it to another?
- Will students need floppy disks or will the electronic portfolio be housed on a district server?

Define the Teacher's Role

The role of the teacher varies in the digitized portfolio development process. Once students understand that the portfolio displays what they have learned and is used for assessment, they may want to plan and design it on their own. Teachers must encourage students to critique their own work, to determine if they are meeting or exceeding the standards, and to find ways to improve. The teacher's role in this process is one of facilitator, helping students formulate probing questions while editing or linking to the essential questions (see chapter 2) or revising work to deepen student understanding. Teachers also need to help students reflect on their progress over time, helping to deepen student understanding of what they need to know and be able to do as a result of the task.

The younger the students, the more teacher input is required when creating electronic portfolios. The following tips can help manage this process:

- Collect work from all students and scan materials into the computer at one sitting instead of scanning each student's work on an individual basis

- Set up separate times to record video and audio clips to insert into the portfolio
- Collect all student work and set aside a block of time to input information into the computer

Older students can input their own information. The following are some tips when working with older students:

- Make sure they have all the off-line work completed before they go to the computer
- If a computer lab exists in the school, check with the teacher to try to incorporate the creation of electronic portfolios into the lab curriculum
- If there are only one or two computers in the classroom, have students work on the same steps in small groups to maximize the use of computer time
- Create a schedule for the use of scanners, digital cameras, and video camcorder to avoid a backlog
- Allow students to work on their portfolios during study hall or before or after school

Teachers can save time by assigning students the responsibility of routine tasks when building their electronic portfolios. One student may be able to arrive early in the morning and turn on the computers and pull up the necessary software or the Web site storing the portfolios. Another student may be able to stay after school to shut everything down, maximizing class time for portfolio creation. A couple of students may be in charge of backing up files at the end of each work session. Others may be able to mentor their peers on the use of scanners, video equipment, digital cameras, and any other equipment needed to construct the electronic portfolio. The teacher may want to set up a rotating schedule of mentoring teams and have them divide the jobs among themselves.

Coordinate Computer Availability

Organizing the creation of electronic portfolios depends on the computer resources available at the school. Here are a few suggestions for different configurations:

One Computer Classroom: Arrange small groups or individual students to use the computer on a rotating basis. Plan carefully to ensure whoever is using the computer is organized and has all materials needed to work on the computer. Other students may continue working on other planning, gathering, and reflecting activities until it is their turn to use the computer.

Multiple Computers: Designate one computer to use with the supporting equipment such as a scanner, digital camera, and video camera. Assign another computer for design and reflective work to include word processing and graphs. Reserve a third computer for assembling portfolios. Some teachers may prefer using each computer for multiple tasks on an as-needed basis.

Technology Lab: Help students organize their activities so they are all ready to work on the computer related tasks at the same time. The advantage of having a technology teacher is that he or she can teach the mechanics of how to use the software, whether it is electronic portfolio software or any other application, in a teacher-directed environment during an instructional seminar. Classroom teachers find it hard to set aside time to teach these skills.

Regardless of how many technology resources a school has, it is impossible to have the necessary supporting equipment at students' fingertips all the time. Peripheral equipment such as digital cameras, scanners, video cameras, audiotape player and recorder, or CD player may be housed in the media center. Teachers need to make arrangements to ensure this equipment is available on a rotating basis as different students need them to complete a task.

As districts have larger server capacities, teachers can store electronic portfolios in a central location in the district. In the meantime, teachers can create a portfolio folder on the desktop enabling students to store and add information easily. Teachers can back up small files using a floppy or zip disk.

Reporting to Parents

Many districts mandate the use of a traditional reporting method. Teachers using project-based instruction in a standards-based curriculum find it difficult to assess with a traditional numerical or letter grade system what is demonstrated by the student. As mentioned in chapter 4, teachers can add assessment inserts to report cards or they can devise narrative report cards. An assessment insert is a means of disseminating information to parents and others on how the student has progressed toward the understanding of content standards and how these standards are applied to project work.

The key to making these reporting changes work is strengthening the communication link between school and home. Informing parents so they understand why their children are expected to perform certain tasks and why they don't receive lots of paper and pencil tests helps to clearly communicate student progress and validate the importance of project work. Parents need to understand that teachers must use various methods such as checklists, teacher observations, performance assessments, essays, journal writing, and reflection papers, to measure progress. Mastery of an important concept develops over time, and it is this progress that teachers measure, not just the final result. Teachers need to communicate to parents how this progress is compared to the standard expectation to determine if students meet or exceed standard levels of performance.

Consider Assessment Inserts

Traditional Report Card vs. Standards Report Card Insert (see Figure 5.5) explains the correlation of a district's traditional report card and an Assessment Insert. Traditional A, B, and C grades usually represent grades on a 100 point scale. Questions arise when teachers score performance tasks with a four or six point rubric. How does a score of four fit into a traditional grade book? Many teachers find they can easily transfer a four-point rubric to the traditional grading system; however, this is not to say rubrics have to fit into a traditional grading system.

Teachers can use traditional A, B, and C grades to score closed-ended work, such as multiple choice tests, fill-in-the-blank worksheets, and questions answered from a textbook. Rubrics (see chapter 1), whether holistic or analytical, work best with projects. Teachers set criteria that inform students up front what is expected and allow for student revision throughout the assignment.

Traditional Report Card vs. Standards Report Card Insert

Rubric Scoring Scale	Rubric Grading Scale for Standards	Traditional Report Card Grading Legend	Score Range	Traditional Grading Scale Terminology
4	Outstanding	A	93–100	Excellent
3	Satisfactory	B	85–92	Good
2	Progressing	C	76–84	Average
1	Needs Improvement	D	70–75	Below Average
0	No Attempt	F	0–69	Failure

Figure 5.5

Try Narrative Reporting Methods

As districts increase the use of performance assessments and nontraditional evaluation strategies, narrative reporting methods can give a general explanation to parents of their children's progress. In the elementary school, the focus is on reading, writing, and mathematics to build a solid literacy foundation and promote social development. Secondary schools focus on literature, mathematics, science, and social studies. At all levels (K–12), students need to direct attention toward meeting or exceeding the standards for a particular grade level and using critical thinking skills to solve problems in real-world situations. One recommendation is to start using a narrative report card (see chapter 4) with one content area and add another content area each year.

A Bridge to the Future

The heart of school restructure is centered around preparing students for the work force of the twenty-first century. Many of the jobs in previous decades barely exist now—one doesn't see many want ads for milkmen or secretaries with shorthand skills. Likewise, a newspaper from the 1950s probably didn't advertise for many Internet web masters or genetic engineers. As President Clinton stated in his 1996 inaugural campaign, the American nation must build a bridge to the future. This can only be achieved through nurturing and educating students to recognize the connection and relationship among the various content areas and to be competent in reading, writing, listening, speaking, creating, thinking, and computing.

Schools following a suggested three-year SIP that supports standards-based curriculum, project-based teaching and learning, and integration of technology and performance assessment equip teachers with the skills necessary to prepare students for the information age of the twenty-first century. For students to succeed, teachers must teach them how to find and use information, work collaboratively in groups, think critically, and problem solve.

The appendixes contain units and project templates for high school, middle, and elementary use. The samples serve as road maps to help teachers implement projects.

Appendix A

Where Have You Gone, Joe DiMaggio?

Relationships with Literature

Topical Theme: The Role of the Hero in Literary Tradition

This unit focuses on the role and nature of the hero as it relates to the character development of Santiago in Hemingway's short novel, *The Old Man and the Sea*. Further discussion may focus on the nature of role models and/or hero worship after examining Santiago's admiration for Joe DiMaggio and the relationship between Santiago and Manuel, the young boy in the novel. Teachers can use this exercise as the basis for class discussion followed by a writing activity, focusing on the use of comparison and contrast as a means of development in essay writing. A web/framework notes the integrated relationships with other disciplines, and there are activities for content areas.

Subject/Grade Level: Reading/Literature, grades 6–12

Conceptual Focus: Heroes/Change

Processes: Language Arts (Reading, Writing, Listening, Speaking), Creating, Computing, Thinking

Materials

The Old Man and the Sea, Ernest Hemingway
"Mrs. Robinson" (song), Simon and Garfunkel
"Sign of the Times," Tom Verducci, *Sports Illustrated* (May 3, 1993), pp. 14–21.

Introduction

After students read the Verducci article, the teacher will emphasize the nature and characteristics of the hero in the literary tradition. This serves as a springboard for discussion of the Hemingway text. Any introductory discussion should include a focus on what students should know, do, and understand upon the completion of the lesson and/or unit.

Presentation

Direct the discussion toward the development of Santiago's character and his relationship with Manuel, the boy. Note similarities in this relationship to that of Santiago's admiration for Joe DiMaggio. Follow up by listening to "Mrs. Robinson," and discuss the songwriter's lament, "Where have you gone, Joe DiMaggio? A nation turns its lonely eyes to you." Note the need for heroes and/or role models in society. Relate to the Verducci article that traces the demise of sports heroes.

Activity

Allow students to generate, develop, and write a comparison/contrast essay that deals with issues raised in the class discussion. Possible topics might include:

- Compare and contrast Hemingway's and Simon's view of Joe DiMaggio
- Compare and contrast the relationship between Santiago and Manuel with the one between Santiago and DiMaggio
- Discuss the changing role of heroes in contemporary society (from the 1950s, the setting for *The Old Man and the Sea,* to the present day).

Prior to the writing activity, be certain to include a discussion of the characteristics and organizational development of comparison and contrast writing.

Supplemental Activities

Listen to a recording of "The Bug;" there are two versions — one by Mary Chapin Carpenter and another by Dire Straits. Focus on the lines "Sometimes you're the windshield; sometimes you're the bug/ Sometimes you're the Louisville Slugger; sometimes you're the ball." Examine the use of metaphor and discuss the character of Santiago at the conclusion of the novel. Is he the Louisville Slugger or is he the ball? Relate to Hemingway's notion that "a man can be defeated but not destroyed."

Develop follow-up activities in relation to any of the selected readings found on the reading list. If the unit of study is focused on the concept of heroes and the development of character in fiction, there are several good tie-ins.

Suggested Reading List

Shoeless Joe, W.P. Kinsella
The Natural, Bernard Malamud
"Casey at the Bat" (both the Thayer poem and the DeFord story)

Heart of a Champion, Carl Deucker
Sports in Literature, Bruce Erma, ed.
Team Mates, Peter Golenbock
When Willard Met Babe Ruth, Donald Hall
In the Year of the Boar and Jackie Robinson, Bette Bao Lord
At the Crack of the Bat, Lillian Morrison, ed.
"Baseball Talk," *Milton's Teeth and Ovid's Umbrella,* Michael Olmert
Baseball in April, Gary Soto
Striking Out, Wil Weaver

Integrated, Interdisciplinary Activities

Literature and Media

(Note the inclusion of language arts skills and processes.)

Essential Understandings

- People may share similarities and differences with the heroes they admire
- Life experiences shape and change people's character
- "A man can be defeated but not destroyed" (*The Old Man and the Sea,* Ernest Hemingway)

Guiding Questions

- What is a hero? Who is a hero?
- Why (or why not) is Santiago considered a hero?
- How are Santiago and Joe DiMaggio alike? different?
- How do the events on the sea shape Santiago as a person?
- How can a "man be defeated but not destroyed"?
- Why is baseball considered a metaphor for life?

Content Standards

Students should be able to do the following:

- Speak and write appropriately for specific purposes and audiences
- Derive literal, implied, and personal meaning from different kinds of texts and presentations (literary, informative, and technical)

- Access, organize, evaluate, and use information obtained by listening, reading, and viewing a variety of texts
- Use literary knowledge as a basis for understanding themselves and society

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Prepare, develop, and write a brief narrative essay recalling your fondest or best baseball-related memory or experience
2. After viewing and discussing the film *A League of Their Own*, prepare, develop, and write a persuasive essay on the topic "Should women be allowed to play major league baseball?"
3. After reading and discussing *The Natural*, *Shoeless Joe*, and/or *The Old Man and the Sea*, prepare, develop, and write an expository essay on the topic "The Role of the Hero in Society."
4. Select a major league baseball team (or minor league team) and track its progress during the course of the unit. Collect information about the team, its wins and losses, team injuries, road trips, home stands, etc., and create a sports magazine or newspaper section to publish this information. (Note math connections.)
5. Combine oral and written language skills by creating and conducting interviews with figures in baseball (real or fictional). These interviews can either be audiotaped, videotaped, or transcribed.
6. After reading and discussing Michael Olmert's "Baseball Talk," explore and identify ways baseball terminology has crossed over into mainstream language (the vernacular). Ask students to cite specific examples from print or nonprint media.
7. After listening to a radio broadcast of a baseball game, identify examples of figurative language used by the announcers during the broadcast.

Social Studies

Essential Understandings

- Life experiences and basic beliefs influence the actions of people and cultures of various times and places

- Cultural differences and diversity can lead to peace, conflict, or misunderstanding
- Changes in population affect patterns of growth, development, and migration
- Economic policies alter patterns of financial management and shape laws of supply and demand

Guiding Questions

- Why do people (or nations, for that matter) need heroes?
- How do life experiences influence the actions of people?
- In what way do the basic beliefs of a culture shape the actions of people or society?
- How do time and place shape life experiences?
- How is/was segregation shaped by cultural differences and/or diversity?
- What is meant by tolerance? intolerance?
- In what ways do the beliefs of a people influence the role and actions of government?
- How do political actions, societal influences, and economic patterns affect shifts in populations?
- What is the nature of the relationship between economic supply and demand, and individual financial management?

Content Standards

Students should be able to do the following:

- Interpret social systems of different cultures, based on a knowledge of their arts, religions, and philosophies
- Analyze the impact of location and the interactions between the environment and people across continents
- Make sound financial decisions, based on a knowledge of different economies and economic systems

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Develop a time line of significant events in baseball history. Parallel these events with significant events in American history.
2. Research past and present homes of major league teams to determine how the growth and development of baseball

mirror growth and development in the United States. Identify locations of major American cities that are home to baseball teams. Using and/or drawing a map, locate and identify teams and their cities.

3. Research and explore the existence of *de facto* racial segregation in America and baseball from the 1920s through the 1950s. Such a study should explore the Negro Leagues and their prominent players, the social conditions that created the Negro Leagues and later led to their demise, and the similarities and differences between the Negro Leagues and Major League Baseball.
4. Construct an economic chart (perhaps in the form of a baseball scorecard) to show the costs associated with baseball (salaries, ticket prices, concessions) from the 1950s to present day.
5. After reading and discussing Bette Bao Lord's *In the Year of the Boar and Jackie Robinson* and Peter Golenbock's *Team Mates*, form teams of immigrant groups (English, Irish, Jewish, Asian, African-American). Each team prepares a presentation on "Coming to America," describing their experiences as newcomers to this country and their perception of baseball.
6. Form teams. Each team selects a decade in U.S. history since 1870 and prepares a presentation comparing the events in history during that decade with events in baseball during that same period.

Mathematics

Essential Understandings

- Patterns of mathematics describe changes in economics
- Methods of mathematical communication reflect and describe relationships, illustrate ideas, and apply principles of mathematics
- Mathematical reasoning shapes estimations
- The use of scale and dimension reflects mathematical language and symbols
- Mathematical principles provide problem-solving strategies

Guiding Questions

- What mathematical patterns are present in economic changes? How do these economic changes reflect relationships and connections to daily life?
- How do methods of mathematical communication reflect changes, describe relationships, illustrate ideas, and apply principles of mathematics to events in science, social studies, and daily life experiences?
- Using mathematical reasoning, how can one solve problems, make predictions, or create estimations?
- Using principles of mathematics, how does one compute and use geometry, algebraic functions, and measurement to solve real and theoretical problems?

Content Standards

Students should be able to do the following:

- Solve theoretical and real-world problems that require various approaches to investigate, understand, and apply mathematical concepts
- Express ideas and solutions through appropriate mathematical language and symbols
- Use mathematical reasoning to analyze and answer theoretical and real-world questions and problems
- Make connections between mathematics and their daily lives to answer questions, solve problems, and complete authentic projects
- Use appropriate technology to solve problems and to communicate ideas and solutions

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Create and draw a ballpark to scale using appropriate dimensions. Variations include measuring the dimensions in different units of measure from inches to feet to yards or centimeters to decimeters to meters. [Include in the plans provisions for patrons with disabilities as well as an evacuation plan.]
2. Compute a batter's batting average, slugging percentage, and on-base percentage as well as a pitcher's earned run average.

3. Explain the economic impact of baseball: salaries (players, staff, stadium workers, etc.), merchandising, etc.
4. Create charts and graphs to illustrate teams' win-loss records, player statistics, game attendance, etc.
5. Plan and develop a travel schedule for a team on a two-week road trip. Include all modes of transportation needed not only between cities but also to and from airports, hotels, and stadiums. All expenses per player and coach must be computed on a per diem and included in the total cost of the trip.

Science and Health

Essential Understandings

- Changes in force affect motion and momentum
- Cycles of nature influence changes in organisms' patterns of growth
- The evolution of technology demonstrates a process of progression and reflects patterns of change
- Behaviors of diet and exercise create changes in organisms' growth and development

Guiding Questions

- In what ways do changes in force affect motion and momentum?
- How do cycles of nature influence patterns of growth?
- How do these cycles affect plant growth?
- How do plants adapt, change, and survive?
- In what ways has technology changed the sport of baseball? Have these changes been positive? Why or why not?
- What is the value and significance of change?
- How do changes in dietary patterns and behaviors affect growth and development? What is the effect(s) on strength and endurance?
- How do patterns of exercise influence and change growth and conditioning?

Content Standards

Students should be able to do the following:

- Solve real-world problems through scientific inquiry methods (questioning, predicting, experimenting, collecting and displaying information, and drawing valid conclusions), using appropriate technology to communicate ideas effectively
- Interpret situations that affect their everyday lives by using knowledge of energy, matter, force, and motion
- Use knowledge of the similarities, differences, and interdependence of living things to analyze and assess events and actions that impact life on Earth
- Evaluate how science and technology affect their personal lives and society as a whole

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Research technological advancements in the sport of baseball (equipment, uniforms, etc.).
2. Explore the physics of baseball: force (push/pull), aerodynamics, trajectory (parabolic path), simple/complex machines (bat, human muscles), friction, and impulse momentum.
3. Explore the agronomy of baseball (natural turf and its care and development).
4. Research the invention and development of artificial turf and compare its use and cost with natural turf fields, noting advantages and disadvantages (including related sports injuries).
5. Identify those areas of baseball that reflect beauty and grace of movement, researching the major muscle groups used, developed, and conditioned while playing a season of baseball.
6. Create a concession stand menu that offers healthy choices at competitive prices for food and beverages.

Art and Music

Essential Understandings

- Works of art reflect cultural differences and diversity
- Composition (in art, music, literature) illustrates form and function
- Art illustrates life experiences and basic beliefs
- Art communicates ideas, feelings, and attitudes
- Life imitates art; art imitates life

Guiding Questions

- How do art, music, and literature reflect and illustrate cultural differences and diversity?
- What is the relationship of composition to art, music, and literature?
- What is the connection between the elements of composition and form and function?
- How do the arts communicate life experiences (ideas, feelings, and attitudes)?
- Why do people or artists choose the arts as a medium for communicating complex ideas?
- Does life imitate art or does art imitate life? How?

Content Standards

Students should be able to do the following:

- Communicate ideas, feelings, and attitudes through one or more of the arts disciplines (dance, music, theater, and visual arts)
- Make sound judgments about the value of different types of artistic products (dance, music, theater, and visual arts)

Activities/Tasks

Invite students to do one or more of the following activities:

1. Design a commemorative stamp honoring a literary figure/character studied during the course of the unit.
2. Create a comic strip depicting a significant event from one of the literature selections read and studied.

3. Analyze and critique selected songs, noting thematic and lyrical connections to literary selections read and studied.
4. Assess the elements of composition that link art, music, and literature.

Reading List

The preceding unit plan and supporting activities and the following reading list are ways to motivate and encourage intermediate and adolescent readers, especially males. This literature ranges from novels to short stories for adolescents, children, and older readers. Teachers can build these works into a thematic unit, large or small, for readers from middle school through college, focusing on issues ranging from character to theme to symbol to metaphor and more. These works are the basis for literature-based instruction, helping students to become better readers and writers as they respond to good literature.

Novels

Bang the Drum Slowly, Mark Harris
Shoeless Joe, W. P. Kinsella
The Natural, Bernard Malamud

Short Stories and Anthologies

"Casey at the Bat," Frank DeFord (*Sports Illustrated,* July 1988)
Sports in Literature, Bruce Erma, ed.
Fielder's Choice, Jerome Holtzman, ed.
Tales of the Diamond, Hyman and Thorpe, eds.
Writing Baseball, Jerry Klinkowitz, ed.

Nonfiction

Eight Men Out, Eliot Asinof
"A Sunny Day at the Ballpark," David Bamberger (*Sports Illustrated,* May 96)
"Fiction in a Diamond Setting," Ron Fimrite (*Sports Illustrated,* October 90) *October 1964,* David Halberstram
Summer of '49, David Halberstram
"A Season in the Minors," David Lamb (*National Geographic,* August 91)
Stolen Season, David Lamb
"Baseball Talk," *Milton's Teeth and Ovid's Umbrella,* Michael Olmert
Mudville Diaries, Mike Schact, ed.
"Sign of the Times," Tom Verducci (*Sports Illustrated,* May 93)
Baseball, Geoffrey C. Ward and Ken Burns

Diamonds in the Rough: the Untold History of Baseball, Joel Zoss and John Bowman

Children's Literature

Lou Gehrig: The Luckiest Man (nonfiction), David Adler
What Hearts (fiction), Bruce Brooks
Trouble on the T-Ball Team (fiction), Eve Bunting
Heart of a Champion (fiction), Carl Deucker
Painting the Black (fiction), Carl Deucker
Team Mates (nonfiction), Peter Golenbock
Honus and Me: A Baseball Card Adventure (fiction), Dan Gutman
When Willard Met Babe Ruth (fiction), Donald Hall
Dinosaur Bob and the Family Lazardo (fiction), William Joyce
About the B'Nai Bagels (fiction), E.L. Konigsburg
In the Year of the Boar and Jackie Robinson (fiction), Bette Bao Lord
At the Crack of the Bat (poetry), Lillian Morrison, ed.
My Brother Stealing Second (fiction), Jim Naughton
Fielder's Choice (fiction), Rick Norman
Take Me Out to the Ball Game (poetry), Jack Norworth
"The Pinch Hitter," Michael Parent in *Best Loved Stories told at the National Storytelling Festival*
Baseball Saved Us, Scholastic, Inc.
How Georgie Radbourn Saved Baseball (fiction), David Shannon
Finding Buck McHenry (fiction), Alfred Slote
Baseball in April (fiction), Gary Soto
The Field Beyond the Outfield (fiction), Mark Teague
"Casey at the Bat," (poem) Ernest Lawrence Thayer
Farm Team (fiction), Will Weaver
Striking Out (fiction), Will Weaver

Media

Bang the Drum Slowly (film)
"The Bug" (song), Mark Knopfler [Dire Straits], also Mary Chapin Carpenter
"Centerfield" (song), John Fogerty
City Slickers (film)
Eight Men Out (film)
Field of Dreams (film)
"Glory Days" (song), Bruce Springsteen
Indiana Jones and the Last Crusade (film)
A League of Their Own (film)
"Mrs. Robinson" (song), Simon & Garfunkel, also The Lemonheads
The Natural (film)

"Night Game" (song), Paul Simon
"The Obvious Child" (song), Paul Simon
Parenthood (film)

The Classics

The Old Man and the Sea, Ernest Hemingway
The Arthurian Legends and Tales

Professional Literature

English Journal (April 90)
Learning92 (September 92)
Reading Baseball, Barbara Gregorich & Christopher Jennison
Sports Playoffs, Julie B. Froman
Writing! (January 87)

Instructional Resources

Baseball http://www.coe.ufl.edu./faculty/lamme/project/baseball.html
Baseball Bibiliographies http://www.iea.com/sallyep/bbbibs.html
Baseball is Life? www.cofc.edu/abramsa/Baseball_is_Life.htm
Curriculum Design On-Line: Life is Like a Game of Baseball http://www.rogertaylor.com/file.html
Guide to Baseball Fiction www.uta.edu/english/tim/baseball/index.html
Learning is a Hit *Donruss Baseball Learning Series*
Recommended Baseball Fiction www.kypris.com/Baseball/bb-fiction.html

Internet Sites

Major League Baseball www.majorleaguebaseball.com
National Baseball Hall of Fame www.baseballhalloffame.org/index/html
Negro League Baseball (MLB) www.majorleaguebaseball.com/nbl
Negro Leagues www.negroleaguebaseball.com
Negro Leagues Baseball Museum www.negroleaguesmuseum.com/home.asp
Shadowball www.negro-league.columbus.oh.us
The Virtual Athlete Bookstore www.webgrafxx.com/virtualathlete/books/baseball.html

Standards Based Integrated Project Template

Project Title: "Where Have You Gone, Joe DiMaggio?"
Team #: Grade Level: 6-12
Teachers: Time Period:

Culminating Activity: Build a baseball field on the school campus, local park or community area.
Essential Question: What is the nature of the relationship(s) between students and their community?

Literature/Reading

a. Write a persuasive essay (verbal/linguistic)
b. Interview city official and community members for their view on building baseball field (interpersonal)
c. Track baseball team and record data on community growth (logical/mathematical)
d. Write an exploratory essay based on the community response (naturalist)
e. Create and conduct interviews with baseball figures (real or fictional) (interpersonal)
f. Construct a musical time line sequencing major events in building the baseball field (musical/rythmic)
g. Dramatize a novel (body/kinesthetic)

TECHNOLOGY
h. audiotape
i. videotape
j. word processing

Science

a. Identify/label/illustrate simple/complex machines and construct a set of representational diagrams (visual/spatial)
b. Compare/constrast simple/complex machines (muscle use) relating to baseball and create charts (logical/mathematical)
c. Research and create climatic map of cities most suitable to the sport of baseball (naturalist)
d. Explore the physics of baseball: play the game and analyze trajectory, friction, impulse momentum; write a group report (interpersonal, body/kinesthetic)
e. Create charts/interpret data on the most suitable materials needed to build field (naturalist, logical/mathematical)

TECHNOLOGY
f. digital camera
g. scanned images
h. multimedia presentation tool

Mathematics

a. Create and draw a ballpark (visual/spatial)
b. Compute, create graph on amount of materials needed to build benches, dugouts, fences and concession stand (logical/mathematical)
c. Calculate average temperature during season for a particular team (naturalist)
d. Develop building schedule, calculate time needed to complete, create public relations brouchure for the community, and report orally to city council or community group (verbal/linguistic, logical/mathematical)
e. Calculate dimensions and measurement (logical/mathematical)

TECHNOLOGY
f. calculator
g. drawing program
h. video

Standards Based Integrated Project Template (Cont.)

Project Title: Where Have You Gone, Joe DiMaggio?
Team #: Grade Level: 6–12
Teachers: Time Period:

Culminating Activity: Build a baseball field on the school campus, local park, or community area.
Essential Question: What is the nature of the relationship(s) between students and their community?

The Arts

a. Submit an architectural diagram to city/school board/PTO council for building approval. Make oral presentation (interpersonal, verbal/linguistic)
b. Illustrate completed baseball field, present to class (visual/spatial, interpersonal)
c. Role-play concession stand operation (interpersonal, bodily/kinesthetic)

TECHNOLOGY
d. drawing software
e. digital camera
f. slide show presentation

Social Studies

a. Survey ground and area to determine best location for field (bodily/kinesthetic)
b. Develop time line of signficant baseball related events in community (logical/mathematical)
c. Compare/constrast baseball stadiums in different areas of the country, create theme song (musical/rhythmic, logical/mathematical)
d. Describe life if you were born a baseball player (intrapersonal)
e. Economic impact experienced when a professional baseball team moves to town (logical/mathematical)

TECHNOLOGY
f. time line program
g. word processing
h. graphing software

Health & Physical Education

a. Play baseball outside (bodily/kinesthetic, naturalist)
b. Outline, then recreate how benches were built, act out (visual/spatial, bodily/kinesthetic)
c. Select a play and create a demonstration video (intrapersonal, interpersonal, bodily/kinesthetic)
d. Create concession stand menu that offers healthy choices (interpersonal, bodily/kinesthetic)

TECHNOLOGY
e. digital scale
f. camcorder
g. word processing

Appendix B

Wolf River Anthology

Developing Literature-Based Science Relationships

> "Imagination is more important than knowledge."
> Albert Einstein

> "The world is but a canvas to our imaginations."
> Henry David Thoreau

Topical Theme: Wolf River Anthology
This unit builds on students' natural curiosity and sense of inquiry. Recognizing their sense of wonder and curiosity is the foundation of scientific inquiry. This unit helps teachers create a classroom environment that fosters a scientific attitude through reading experiences and active participation. Beginning with good literature that has a science base leads students beyond factual recall and memorization to an understanding of concepts and opportunities to experience facts. Facts only make sense if they are clearly related and connected to concepts while concepts themselves are broadened and enriched by facts. The following are essential questions that should drive the entire unit:

- What are the wonders of our environment?
- What patterns and changes are evident in the world around us?
- In relation to what our students read, consider the viewpoint (perspective) that readers are seeing, hearing, and reading. What is the author's position? What are the author's intentions?

Subject/Grade Level: Science/Literature, grades 4–8

Conceptual Focus: Patterns/Change/Adaptations

Processes: Language Arts (Reading, Writing, Listening, Speaking), Creating, Computing, Thinking

Materials

The Stranger, Chris Van Allsburg
Owl Moon, Jane Yolen
Stellaluna, Janell Cannon

Introduction

Guide students through a reading lesson using Van Allsburg's *The Stranger* (or substitute *Owl Moon* or *Stellaluna*, if desired), incorporating principles of both reading and writing workshop. A good start is to conduct a read aloud, using probing and guiding questions to draw student interest and to allow opportunities for making inferences and predictions.

Presentation

Direct the class discussion toward the development of plot and the role of the mysterious character, the stranger of the title. Note, in particular, the literary technique of foreshadowing used to provide clues as to the stranger's identity. In addition, note the seasonal patterns and changes that are evident (and illustrated in word and in art) throughout the story and the relationship to the stranger's length of stay with his hosts.

Activity

Allow students to generate, develop, and write a paragraph or essay that deals with issues raised in the class discussion. Possible topics might include the following:

- Describe a time when you felt you were a stranger
- Describe the relationship between the stranger and the seasons
- Develop a response that describes who you think the stranger really is

Prior to the writing activity, be certain to include a discussion of the characteristics and organizational development of descriptive, expository, and/or narrative writing.

Supplemental Activities

This introductory lesson is the basis for beginning a look at the concepts of patterns and change, not only as they relate to principles and concepts of science, but also as they are revealed and reflected through literature. Examination of a text like *Owl Moon* with its narrative and lyrical poetry provides students language experiences that maintain the integrity of the content drawn from various disciplines and also enables students opportunities for inquiry in these disciplines.

Develop follow-up activities in relationship to any of the selected readings found on the reading list. With the unit of study focused on the concepts of patterns and change primarily in science as revealed through fiction, there are several good tie-ins.

Suggested Reading List

Stellaluna, Janell Cannon
Julie of the Wolves, Jean Craighead George
Call of the Wild, Jack London
Spoon River Anthology, Edgar Lee Masters
Never Cry Wolf, Farley Mowat
The Yearling, Marjorie Rawlings
The Stranger, Chris Van Allsburg
Charlotte's Web. E.B. White
The Journey of Natty Gann (film/video)

Most of these titles may be supplemented with film/video; be certain that such use complies with local district's copyright and acceptable use policies.

Integrated, Interdisciplinary Activities

Literature and Media

(Note the inclusion of language arts skills and processes.)

Essential Understandings

- People's perspective shapes their behavior
- Time and place influence behavior and shape change
- Life experiences shape and change people's character

Guiding Questions

- How does perspective (point of view) change from person to person, character to character?
- In what ways can time and place create change and shape behavior?
- How do experiences impact behavior and create change?

Content Standards

Students should be able to do the following:

- Speak and write appropriately for specific purposes and audiences.
- Derive literal, implied, and personal meaning from different kinds of texts and presentations (literary, informative, and technical)
- Access, organize, evaluate, and use information obtained by listening, reading, and viewing a variety of texts
- Use literary knowledge as a basis for understanding themselves and society

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Using any one of the literary texts in this unit, develop an essay that expresses personal point of view concerning plot, character, or conflict and compare that point of view with a partner. Note differences and similarities in varying points of view.
2. Retell the tale from a differing point of view; for example, from the wolf's perspective rather than the central character's. Use new learnings and understandings about wolves in your writing.
3. In *Julie of the Wolves*, is the description of the communication between Julie and the wolves realistic? In an essay, develop a response according to what you learned about wolves in this unit of study.
4. Compare and contrast the film version and the book *Never Cry Wolf* considering not only similarities and differences, but also point of view (perspective taking).
5. Compare Julie (from *Julie of the Wolves*) with Natty (in *The Journey of Natty Gann*). How do these two characters make adaptations and changes that lead to their survival?
6. Select a book read during this unit and keep a journal of your thoughts about plot, character, and conflict. Then, develop an oral history that reflects your growth and change as a person, physically and emotionally.

7. Write a letter to a government agency, defending or attacking the reintroduction of wolves into parklands across the country (Yellowstone or the Great Smoky Mountains).
8. Using a variety of poetical forms, create poems (haiku, cinquain) that reflect the spirit and nature of the wolf.
9. After reading selected entries from Masters' *Spoon River Anthology*, create poems that model these epitaphs while at the same time reflect personal narrative and history. Collect and bind or display students' work as *Wolf River Anthology*, showcasing and celebrating student writing based on responses to literature.

Social Studies

Essential Understandings

- Life experiences and basic beliefs influence the actions of people and cultures of various times and places
- Cultural differences and diversity can lead to peace, conflict, or misunderstanding
- Changes in population affect patterns of growth, development, and migration

Guiding Questions

- How do life experiences influence the actions of people?
- In what ways do cultural differences create changes in perspective?
- How do the basic beliefs of a culture shape the actions of people?
- How do time and place shape life experiences?

Content Standards

Students should be able to do the following:

- Interpret social systems of different cultures, based on a knowledge of their arts, religions, and philosophies
- Analyze the impact of location and the interactions between the environment and people across continents

Activities/Tasks

Invite students to complete one or more of the following activities:

1. After a study of Canada and Alaska, create three-dimensional maps that reflect the geography and terrain of *Never Cry Wolf, Julie of the Wolves*, or *Call of the Wild.*
2. Compare the structure of the Canadian government and the U.S. government.
3. Examine the economic conditions that affected Natty Gann and her father and caused changes in their lifestyles.
4. Create maps that illustrate journeys taken by major characters in the books studied during this unit.

Mathematics

Essential Understandings

- Patterns of mathematics reflect change
- Methods of mathematical communication reflect and describe relationships, illustrate ideas, and apply principles of mathematics
- Mathematical reasoning shapes estimations
- The use of scale and dimension reflects mathematical language and symbols
- Mathematical principles provide problem-solving strategies

Guiding Questions

- How do mathematical patterns reflect changes in daily life? How do these patterns reflect relationships and connections to daily life?
- How do methods of mathematical communication (models and symbols) reflect changes, describe relationships, illustrate ideas, and apply principles of mathematics to events in science, social studies, and daily life experiences?
- Using mathematical reasoning, how can one solve problems, make predictions, or create estimations?
- Using principles of mathematics, how does one compute and use geometry, algebraic functions, and measurement to solve real and theoretical problems?

Content Standards

Students should be able to do the following:

- Solve theoretical and real-world problems that require various approaches to investigate, understand, and apply mathematical concepts
- Express ideas and solutions through appropriate mathematical language and symbols
- Use mathematical reasoning to analyze and answer theoretical and real-world questions and problems
- Make connections between mathematics and their daily lives to answer questions, solve problems, and complete authentic projects
- Use appropriate technology to solve problems and to communicate ideas and solutions

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Examine the changes in economics from the settings of works studied to present day prices for goods and services.
2. Create charts and graphs that reflect the seasonal changes over the course of the literature titles read.
3. Plan and develop a travel schedule for characters in any of the works studied, using the modes of transportation available to them as they traveled over the course of their narrative exploits.

Science and Health

Essential Understandings

- Adaptations illustrate how living things depend on one another and the environment for survival
- Cycles of nature influence changes in organisms' patterns of growth
- Behaviors of diet and exercise create changes in organisms' growth and development

Guiding Questions

- How do cycles of nature influence patterns of growth?
- How do these cycles affect plant growth?
- How do living things adapt, change, and survive?
- What is the value and significance of change?
- How are humans like wolves?
- How do changes in dietary patterns and behaviors affect growth and development? What is the effect(s) on strength and endurance?
- How do patterns of exercise influence and change growth and conditioning?

Content Standards

Students should be able to do the following:

- Solve real-world problems through scientific inquiry methods (questioning, predicting, experimenting, collecting and displaying information, and drawing valid conclusions), using appropriate technology to communicate ideas effectively
- Interpret situations that affect their everyday lives by using knowledge of energy, matter, force, and motion
- Use knowledge of the similarities, differences, and interdependence of living things to analyze and assess events and actions that impact life on Earth
- Evaluate how science and technology affect their personal lives and society as a whole

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Create a wolf habitat that illustrates the patterns of organization and relationships in an ecosystem
2. Design a web or chart that illustrates the predatory nature of wolves showing relationships found in a food chain.
3. Draw a map that illustrates the range and domains of the wolf in North America today compared to fifty years ago, a hundred years ago. Show effects of urbanization and colonization on the wolf population.
4. Design an experiment that examines the decomposing process in the Arctic, using principles of control and test data.

(Students could bury organic material in two flower pots, placing one in a warm area and another in a freezer, and compare the results after a specified period of time.)

Art and Music

Essential Understandings

- Works of art reflect cultural differences and diversity
- Composition (in art, music, literature) illustrates patterns of form and function
- Art illustrates life experiences and basic beliefs
- Art communicates ideas, feelings, and attitudes
- Life imitates art; art imitates life

Guiding Questions

- How do art, music, and literature reflect and illustrate patterns found in nature and in society?
- What is the relationship of composition to art, music, and literature?
- What is the connection between the elements of composition and form and function?
- How do the arts communicate life experiences (ideas, feelings, and attitudes)?
- Why do people or artists choose the arts as a medium for communicating complex ideas?
- Does life imitate art or does art imitate life? How?
- How has the portrayal of wolves in art, literature, and mythology shaped beliefs about wolves?

Content Standards

Students should be able to do the following:

- Communicate ideas, feelings, and attitudes through one or more of the arts disciplines (dance, music, theater, and visual arts)
- Make sound judgments about the value of different types of artistic products (dance, music, theater, and visual arts)

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Create an art form that depicts a scene from any of the titles read.
2. Compose a Native American song and/or dance that reflects the themes found in the works studied.
3. After listening to Prokofiev's "Peter and the Wolf," create and/or compose an art form that reflects the mood(s) and patterns created by the music.

Culminating Task/Project/Performance

Create a booklet, portfolio, or performance based on one of the following topics:

- Kinds of wolves
- Physical characteristics and appearance of wolves
- Range of wolves
- Habits and behaviors of wolves
- Care and nurturing of the young
- Hunting practices/behaviors of wolves
- Relationships between wolves and humans
- Maps illustrating the habitats of wolves in the present and the past
- Map(s) illustrating the setting of *Julie of the Wolves, The Call of the Wild,* or *Never Cry Wolf*
- Annotated bibliography of stories, fables, folktales, and legends with wolves as central characters

Students and teacher collaboratively establish a rubric for evaluation, including the number of sections to include for each score/grade.

Reading List

The preceding unit plan and supporting activities and the following reading list are ways to motivate and encourage young readers, allowing them to respond to quality literature that has a science base. This literature ranges from children's literature to adolescent literature, featuring both fiction and nonfiction. Teachers can build these works into a thematic unit, large or small, for readers in the intermediate grades, primarily grades four to eight. The selections provide a natural foundation for discussions about literary elements and themes that extend across the disciplines, allowing students opportunities to become better readers and writers as they respond to good literature.

Anthologies (short stories, essays, poetry)

Wolf Songs: The Classic Collection of Writings About Wolves, Robert Busch, ed.
Myths and Legends of the Wolf, Abigail Frost
Pups, Dogs, Foxes and Wolves, Lee Bennett Hopkins
Spoon River Anthology, Edgar Lee Masters
Wolf Tales: Native American Children's Stories, Mary Powell, ed.
Wolf Stories: Myths and True Life Tales from Around the World, Susan Strauss

Children's Literature

Stellaluna, Jannell Cannon
The Lonely Wolf, Chantal DeMarolles
Wolf Island, Celia Godkin
Walk with a Wolf, Janni Howker
The Stranger, Chris Van Allsburg
Owl Moon, Jane Yolen

Fiction

Alpha: A Story of Wolves and People, Kevin Boos
On Call Back Mountain, Eve Bunting
Wolf at the Door, Barbara Corcoran
Julie of the Wolves, Jean Craighead George
Julie, Jean Craighead George
Julie's Wolf Pack, Jean Craighead George
The Wounded Wolf, Jean Craighead George
The Call of the Wild, Jack London
White Fang, Jack London
The Yearling, Marjorie Rawlings
Charlotte's Web, E.B. White

Music

"Peter and the Wolf," Prokofiev

Nonfiction

The Wolf, Michael Dahl
When the Wolves Return, Ron Hirschi
Wolf Reflections, Ken L. Jenkins
Wolves, R.D. Lawrence
Never Cry Wolf, Farley Mowat
Wolves, Susan Ohanian
Gray Wolf, Red Wolf, Dorothy Hinshaw Patent

Teacher Resources and Internet Sites

The Call of the Wild www.humanitiessoftware.com
Intermediate Science through Literature www.lu.com/titles/butinter
Julie of the Wolves www.humanitiessoftware.com
Never Cry Wolf share105.esd105.wednet.edu/CurriculumProjects/SocialStudies/NeverCryWolf
The Searching Wolf www.iup.edu/wolf/wr
Syllabus: How to tell a Story www.websteruniv.edu/schustjm/seminar
Wolves at Our Door school.discovery.com/spring98/programs/wolvesatourdoor
Wolf Literature References, Erich Klinghammer, Monty Sloan and DeWayne Klein

Video/Film

The Journey of Natty Gann
The Call of the Wild
Never Cry Wolf
White Fang
Wolves at Our Door

Standards Based Integrated Project Template

Project Title: Wolf River Anthology
Team #:
Grade Level: 4–8
Teachers:
Time Period:

Culminating Activity: Create a Wolf Habitat for the local zoo.
Essential Question: How do living things adapt to their environment?

Literature/Reading

a. Write a persuasive letter to the zookeeper to sponsor the project (verbal/linguistic)
b. Research habitat requirements for the wolf den & write report (slide show presentation) of findings (interpersonal, visual/spatial)
c. Create an advertising poster to gather community support for the project (interpersonal, verbal/linguistic)
d. Interview local political leaders to gather support (verbal/linguistic)
e. Research wolf background to create informational signs (visual/spatial, logical/mathematical)
f. Create a brochure to advertise the wolf habitat exhibit (verbal/linguistic)
g. Write lyrics for a local radio spot to advertise habitat (musical/rhythmic)

TECHNOLOGY
h. word processing
i. PowerPoint presentation
j. Internet
k. digital camera

Science

a. Research how the wolf fits into the food chain and what diet should be given to a wolf in captivity (naturalist)
b. Create a chart, concept map, or graphic organizer to identify the optimum habitat for wolf colonization and reproduction (logical/mathematical)
c. Conduct a soil analysis for wolf area (naturalist)
d. Calculate optimum climatic conditions for wolf existence (logical/mathematical)
e. Contact other zoos to interview zookeepers about the success of keeping wolves in captivity, building a database (interpersonal, logical/mathematical)

TECHNOLOGY
f. Internet
g. word processing
h. graphing software
i. database software
j. audiotape

Mathematics

a. Calculate cost of habitat (logical/mathematical)
b. Measure area and perimeter of habitat (logical/mathematical, bodily/kinesthetic)
c. Calculate cost of feeding a den of wolves, calculate for one wolf, then five and ten wolves (logical/mathematical, naturalist)
d. Sort the different wolf types by different attributes (logical/mathmatical, intrapersonal)

TECHNOLOGY
e. calculator
f. spreadsheet

Standards Based Integrated Project Template (Cont.)

Project Title: Wolf River Anthology
Team #:
Grade Level: 4–8
Teachers:
Time Period:

Culminating Activity: Create a Wolf Habitat for the local zoo.
Essential Question: How do living things adapt to their environment?

The Arts

a. Draw a picture of the habitat; upon completion, describe how the natural habitat will benefit the zoo (visual/spatial)
b. Write a rap song to advertise the new exhibit at the zoo (interpersonal, verbal/linguistic).
c. Design a CD cover for a CD of nature's sounds (interpersonal, visual/spatial))

TECHNOLOGY
d. drawing program
e. word processing
f. audiotape player

Social Studies

a. Draw a map to scale of the area and design the habitat to suit wolves (logical/mathematical)
b. Construct a 3D representation of the wolf habitat (bodily/kinesthetic, visual/spatial)
c. Research and write a report describing where the largest population of wolves is located in the world (verbal/linguistic)
d. Create a pictorial report of wolves in the different areas of the world (visual/spatial)

TECHNOLOGY
e. drawing program
f. word processing
g. digital camera
h. calculator

Health & Physical Education

a. Develop balanced diets for wolves and humans, compare and contrast, create visual report (visual/spatial, verbal/linguistic)
b. Create a nutritional flyer for pet owners (verbal/linguistic)

TECHNOLOGY
c. spreadsheet
d. slide show presentation
e. digital camera

Appendix C

Our Nature Trail and Environmental Habitat

Preserving the Environment

Topical Theme: The Role of Nature in Literature

This unit focuses on preserving the environment as it relates to character development and how things must change to adapt to different seasons and/or relationships. Experiences learned in literature are related to those in real life. Various writing activities focus on the use of comparison and contrast as a means of development in essay writing. A project template notes the performance tasks in all disciplines with technology woven throughout as students use the knowledge gained in the unit to build a nature trail on the school's campus or nearby park.

Subject/Grade Level: Reading/Literature, K–6

Conceptual Focus: Character Development/Change

Processes: Language Arts (Reading, Writing, Listening, Speaking), Creating, Computing, Thinking

Materials

Charlotte's Web, E. B. White
The Great Kapok Tree, Lynne Cherry
Neighborhood Map Machine, software by Tom Snyder Productions

Introduction

After students read *Charlotte's Web* and *The Great Kapok Tree,* discuss the environment and heroes in the literature. This serves as a springboard for discussion of how things must adapt to their environment and change to survive. Focus introductory discussions on what students should know, be able to do, and understand upon the completion of the lesson and/or unit to extend their learning into their project work.

Presentation

Direct the discussion toward the development of Wilbur's character and his relationship with Charlotte and/or other characters in the story. Note similarities in the relationships to those in the real world, (siblings, friends, parents, teacher, principal). Note the need for students to identify heroes and role models in society and how changes must be made to continue these relationships.

Activity

Allow students to generate, develop, and write comparison/contrast sentences/essays that deal with issues raised in the class discussion. In kindergarten, these activities may need to be teacher-directed until students can write. Possible topics might include the following:

- Compare and contrast the environmental setting between the two stories
- Compare and contrast similarities and differences between the main characters of these stories
- Compare the role of trees and how they change during different seasons

Prior to any writing or teacher-directed written activity, be certain to include a discussion of comparing and contrasting and similarities and differences among relationships.

Develop follow-up activities in relation to any of the selected readings found on the reading list. If the unit of study is focused on the concept of change in the environment and the development of characters in fiction, there are many excellent tie-ins.

Integrated Interdisciplinary Activities

Literature and Media

(Note the inclusion of language arts skills and processes.)

Essential Understandings

- All animals/insects work together to shape our environment
- All animals/insects must adapt to their environment to survive
- Experiences shared by characters in literature parallel real-life situations
- People may share similarities and differences with the heroes they admire

Guiding Questions

- What is a true friend? Who is a true friend?
- How do different animals and insects adapt to seasonal change?
- How could the relationship be changed between Charlotte and Wilbur?
- What are the similarities between the main characters in *Charlotte's Web* and *The Great Kapok Tree?*

Content Standards

Students should be able to do the following:

- Speak and write appropriately for specific purposes and audiences
- Derive literal, implied, and personal meaning from different kinds of texts and presentations (literary, informative, and technical)
- Access, organize, evaluate, and use information obtained by listening, reading, and viewing a variety of texts
- Use literary knowledge as a basis for understanding themselves and society

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Compare how and under what circumstances the animals communicate in *Charlotte's Web* to how they communicate in *The Great Kapok Tree.* Discuss, make a Venn diagram, and write a comparative essay or a sentence depending on the grade level.
2. Prepare, develop, and write a brief narrative essay recalling your experience after taking a walk in nature. Younger children can brainstorm as a group as the teacher writes a collaborative essay for the whole class.
3. Sequence events in the story and create insect pictures using a picture of yourself that displays a particular mood of a character in the story. Write a sentence describing the mood. Students can research (Internet) insect information and draw a picture of their insect using a drawing program.
4. Working in cooperative groups using a laptop computer, write a story about what the main character would do if he/she spent a day on the school's nature area. One person in

the group writes about morning experiences, one about afternoon, and one about evening. Another person writes the last paragraph summarizing the day.

5. After reading *Charlotte's Web* or another piece of literature, prepare, develop, and write an expository essay on the topic How Would the World Be Different If There Were No Animals or Insects?
6. Select an insect such as a butterfly and research the different varieties that exist. Create a newspaper section or butterfly brochure to publish this information.
7. Form groups. Each group develops and acts out an assigned character role. Groups interview each other's characters and describe their importance in the story.

Social Studies

Essential Understandings

- Life experiences and basic beliefs influence the actions of people and cultures in all environments
- Cultural differences and diversity can lead to peace or conflict, influencing change in the environment
- Changes in population affect the environment
- Economic policies and growth affect the change in the environment

Guiding Questions

- Why do people (or different countries) need friends?
- How do life experiences influence the actions of people?
- How do different cultures shape the environment?
- How does the environment shape people's lives?

Content Standards

Students should be able to the following:

- Interpret social systems of different cultures, based on a knowledge of their arts, religions, and philosophies
- Analyze the impact of location and the interactions between the environment and people across continents

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Develop a time line of significant events in the story. Parallel these events with significant events in the real world that are familiar to students.
2. Draw a map illustrating a particular place described in the story. Determine where in the world the story is or could be set and research that area of the world identifying climate, vegetation, and cultures.
3. Research and explore different cultures relating to the literature. Such a study should include customs, foods, geographical locations, and arts.
4. Form groups. Each group selects a story element and makes an oral presentation to the class. (Videotape the presentations.)

Mathematics

Essential Understandings

- Patterns of mathematics describe changes in the environment
- Methods of mathematical communication reflect and describe relationships, illustrate ideas, and apply principles of mathematics
- Mathematical reasoning shapes the environment
- Mathematical principles provide problem-solving strategies for real-world issues

Guiding Questions

- What mathematical patterns are evident in environmental change?
- How do changes in the environment reflect friendships and behaviors that exist in the real world?
- Using mathematical reasoning, how can one solve problems, make predictions, or create estimations in the environment?
- How do methods of mathematical communication (models and symbols) reflect changes in the environment?
- Using principles of mathematics, how does one use geometry, measurement, and algebraic functions to solve real-world problems?

Content Standards

Students should be able to do the following:

- Solve theoretical and real-world problems that require various approaches to investigate, understand, and apply mathematical concepts
- Express ideas and solutions through appropriate mathematical language and symbols
- Use mathematical reasoning to analyze and answer theoretical and real-world questions
- Make connections between mathematics and their daily lives to answer questions, solve problems, and complete authentic projects
- Use appropriate technology to solve problems and to communicate ideas and solutions

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Create a map of the barn and farm area in the story *Charlotte's Web.* Draw the map to scale in the older grades and include symbols with a color key.
2. Take an observational walk on a nature trail. Collect different seeds for sorting, classifying, counting, and making patterns. Form groups. Each group produces graphs displaying the different kinds of information they find. Add the graphs to the class or school Web site.

   Sorting: In groups of 3–5, sort the seeds by color, shape, and size. Create a bar graph using graphing software to illustrate results.

   Classifying: In groups of 3–5, classify the seeds according to the plant the seed came from. Create a bar or line graph using graphing software to illustrate results.

   Counting: In groups of 3–5, count the seeds. Determine who has the most and the least seeds within groups. Groups then compare the number of seeds among groups and produce a class graph. Each group creates a bar or line graph using graphing software to illustrate results.

   Making Patterns: In groups of 3–5, create various patterns with the seeds. For example, create an acorn with acorn seeds, an apple with apple seeds, etc. Write a description of the pattern or explain the pattern to the teacher or peer.

Science and Health

Essential Understandings

- Changes in season affect the environment
- Cycles of nature influence changes in animal and plant patterns of growth
- Behaviors of diet and activity create a change in animal or plant growth

Guiding Questions

- In what ways does seasonal change affect the environment?
- How do cycles of nature influence changes in animal and plant survival?
- How do plants and animals adapt to their environment?
- In what ways has technology impacted the environment?

Content Standards

Students should be able to do the following:

- Solve real-world problems through scientific inquiry methods (questioning, predicting, experimenting, collecting and displaying information, and drawing conclusions), using appropriate technology to communicate ideas effectively
- Interpret situations that affect their everyday lives by using knowledge of energy, matter, force, and motion
- Use knowledge of the similarities, differences, and interdependence of living things to analyze and assess events and actions that impact life on Earth
- Evaluate how science and technology affect their personal lives and society as a whole

Activities/Tasks

Invite students to complete one or more of the following activities:

1. Work in cooperative groups of 3–5 to share observations of insects, plants, and animals. Identify the external differences in these bodies, making a Venn diagram to illustrate findings.
2. Discuss climate and weather looking at several different cities around the world. Discuss seasons and clothing changes for the different seasons. Discuss body coverings, size, and

shape of a squirrel or other animal to determine how it survives the winter months. Discuss how it uses its covering to protect itself from the weather. Use drawing software or poster board to draw the animal on a nature trail during the wintertime.

3. Identify animals and plants in a food web and describe their role (carnivores, herbivores, omnivores, or insectivores, etc.).
4. Demonstrate how several components in a food web can be affected when even one is disturbed.
5. Draw a diagram identifying how your lunch fits in a food web.
6. Discuss a plant's role as a primary producer at the lowest level of a food chain.
7. Take a trip to a nearby nature area. Observe, list, and compare components of the area's food web. If you do not see any animals, look for signs that they have been there—droppings, footprints, feathers, nibbled leaves and twigs, remnants of a meal (bones, fur, etc.), tunnel or path. Discuss signs that people are part of a food chain. Fishing line caught in trees, empty shotgun shells, etc. are evidence of human predation. Does this area offer the natural resources needed for people to exist? What can be done to preserve the resources and food web?
8. Draw a self-portrait at the top of a piece of paper. Below this, draw pictures of each item in your lunch and label them. Group each item in the different food groups and analyze if you are eating a balanced, nutritional diet.

Art and Music

Essential Understandings

- Works of art reflect cultural differences and diversity
- Composition (in art, music, literature) illustrates form and function shaping the environment
- Art communicates ideas, feelings, and attitudes about the environment
- Environment imitates art; art imitates the environment

Guiding Questions

- How do art, music, and literature reflect cultural differences and diversity?
- What is the relationship of composition to art, music, and literature?
- How do the arts communicate environmental experiences (ideas, feelings, and attitudes)?
- Does environment imitate art or does art imitate the environment?

Content Standards

Students should be able to do the following:

- Communicate ideas, feelings, and attitudes through one or more of the art disciplines (dance, music, theater, and visual arts)
- Make sound judgments about the value of different types of artistic products (dance, music, theater, and visual arts)

Activities/T asks

Invite students to complete one or more of the following activities:

1. Design a nature area for the school to improve the environment.
2. Brainstorm a list of winter clothing words. Form small groups. Each group selects a page from clothing pictures (catalogs, etc.) and chooses an article of clothing to cut out. Sort the pictures by color, size, etc. Try to come up with other sorting rules: what one wears on their head, feet, body. Sort, glue, and label pictures on a large chart.
3. Imagine you are on the nature trail on a cold winter day. Write and/or draw a picture to fit the phrase: On a cold winter day, I took a walk and ____________. Older students can use drawing and word processing programs to produce work.
4. After reading *The Great Kapok Tree,* discuss the names of the animals that speak to the man. List them on large poster paper. Choose three animals from the list and determine if they could be found on a nearby nature trail. Gather information from the library, electronic encyclopedia, and Internet. Write a sentence, paragraph, or paper from the information and make an oral presentation to the class.

5. Create drawings depicting a significant event from one of the literature selections read and studied.
6. Analyze and critique selected songs, noting thematic and lyrical connections to literary selections read and studied.
7. Change and act out a different ending to one of the stories read and studied.

Reading List

Birds

Feathers for Lunch, Lois Ehlert
Chicken's Aren't the Only Ones, Ruth Heller
Good Night Owl, Pat Hutchins
Have You Seen the Birds?, Joanne Oppenheim
The Bird Alphabet Book, Jerry Pallotta
Owl Moon, Jane Yolen

Insects and Spiders

If at First You Do Not See, Ruth Brown
The Grouchy Ladybug, Eric Carle
The Very Busy Spider, Eric Carle
The Very Hungry Caterpillar, Eric Carle
The Very Quiet Cricket, Eric Carle
Ant Cities, Arthur Dorros
The Icky Bug Alphabet Book, Jerry Pallotta
Bugs, Nancy Winslow Parker
Charlotte's Web, E. B. White

Plants

Desert Giant, Barbara Bash
Trees, Harry Behn
The Tiny Seed, Eric Carle
Rain Forest, Helen Coucher
Planting a Rainbow, Lois Ehlert
Growing Vegetable Soup, Lois Ehlert
Cactus Hotel, Brenda Guilberson
Plants That Never Bloom, Ruth Heller
The Reason for a Flower, Ruth Heller

Alison's Zinnia, Anita Lobel
A Seed Is a Promise, Claire Merrill
The Flower Alphabet, Jerry Pallotta
The Victory Garden Alphabet Book, Jerry Pallotta
The Giving Tree, Shel Silverstein

Ecology

The World that Jack Built, Ruth Brown
The Great Kapok Tree, Lynne Cherry
Rain Forest, Helen Coucher
Rain Forest Secrets, Arthur Dorros
Recycle!, Gail Gibbons
The Old Lady Who Liked Cats, Carol Greene
Brother Eagle, Sister Sky, Susan Jeffers

Oceans and Ocean Life

Where the Forest Meets the Sea, Jeannie Baker
The Magic School Bus on the Ocean Floor, Joanna Cole
Whales, Gail Gibbons
Blue Sea, Robert Kalan
The Ocean Alphabet Book, Jerry Pallotta
The Underwater Alphabet Book, Jerry Pallotta
Whale's Song, Don Sheldon

Space

Happy Birthday Moon, Frank Asch
Moondance, Frank Asch
Mooncake, Frank Asch
I Want to Be an Astronaut, Byron Barton
Goodnight Moon, Margaret Wise Brown
Paper, Please Get the Moon for Me, Eric Carle
The Magic School Bus: Lost in the Solar System, Joanna Cole
What's Up There?, Dinah Moche
Jupiter, Seymour Simon
The Moon, Seymour Simon
Saturn, Seymour Simon
Stars, Seymour Simon
The Sun, Seymour Simon

Internet

Animals http://www.minspring.com/~zoonet
Climate, Weather, and Environment http://www.weather.com and
http://www.wetland.org/mshmarkt.htm
Insects and Spiders http://www.scottyb.demon.co.uk/wildlife.htm
http://fiske.ci.lexington.ma.us/library2gr3kalambokas.html
Plants and Trees http://cissus.mobot.org/MBGnet/vb/temp/index.htm
http://www.tcgcs.com/~nrolls/garden.html
http://aggie-horticulture.tamu.edu/wildseed/wildflowers.html
http://aggie-horticulture.tamu.edu/kinder/sgardens.html

Standards Based Integrated Project Template

Project Title: Our Nature Trail and Environmental Habitat
Team #:
Grade Level: K–6
Teachers:
Time Period:

Culminating Activity: Nature area or trail
Essential Question: How do living things adapt to their environment?

Literature/Reading

a. Write comparative essay or sentences (verbal/linguistic)
b. Sequence events leading up to completion of product in nature area (logical/mathematical)
c. Write cooperative stories (verbal/linguistic)
d. Design map/setting grid from story (visual/spatial)
e. Observe and classify findings from nature walk (naturalist, bodily/kinesthetic, logical/mathematical)
f. Write a travel brochure for a tour on nature trail (verbal/linguistic, interpersonal)
g. Set goals and create time line for building nature trail (intrapersonal, logical/mathematical)

TECHNOLOGY
h. word processing
i. time line software
j. publishing software

Science/Health/Wellness

a. Plan a nutritionally balanced meal, creating a concept map, assessing needs (intrapersonal)
b. Predict weather in nature area and produce weather broadcast (visual/spatial, interpersonal)
c. Research and label plants/trees in nature area, create self-guided tours with audiotapes (verbal/linguistic, naturalist)
d. Test water in nature area and/or build a wetland area (naturalist, bodily/kinesthetic)
e. Research and build a wildflower garden in nature area (verbal/linguistic, bodily/kinesthetic, naturalist)

TECHNOLOGY
f. videotape
g. audiotape
h. concept mapping software
i. Internet

Mathematics

a. Create word problems for the nature area (logical/mathematical, verbal/linguistic)
b. Measure perimeter and area of the nature area (logical/mathematical, bodily/kinesthetic)
c. Measure, design, calculate costs to build outdoor classroom, benches, flower gardens, wetland area (logical/mathematical, bodily/kinesthetic)
d. Sort, count, classify, make patterns with different objects found on the nature trail (logical/mathematical)
e. Graph information collected on nature trail (naturalist)

TECHNOLOGY
f. spreadsheet calculator
g. word processing software
h. calculators
i. graphing software

Standards Based Integrated Project Template (Cont.)

Project Title: Our Nature Trail and Environment Habitat
Team #:
Grade Level: K–6
Teachers:
Time Period:

Culminating Activity: Nature area or trail
Essential Question: How do living things adapt to their environment?

The Arts

a. Draw animals/plants found on nature walk (visual/spatial, bodily/kinesthetic)
b. Write and produce a play to help people save the environment (intrapersonal, visual/spatial)
c. Create a brochure to promote the nature trail in the community (interpersonal, verbal/linguistic)

TECHNOLOGY
d. videotape
e. drawing software
f. publishing software

Social Studies

a. Draw a diagram of the nature area using symbols, scale, color key, and cardinal directions (visual/spatial)
b. Research and produce a booklet of plant and animal life indigenous to the area (naturalist)
c. Create a rap song to teach facts about the nature area (musical/rhythmic)

TECHNOLOGY
d. drawing software
e. Internet

Glossary

analytic scoring. Scoring performance assessments by individual dimension to provide feedback on particular areas of need.

criteria. Predetermined guidelines for evaluating student work.

concept. An idea or thought that ser ves as a framework for a body of knowledge or integrated unit.

conference. Remedial or extra guided practice time given to students to strengthen skills in areas of weakness.

essential question. The overall topic or theme driving the instruction.

essential understandings. Two or more concepts in a relationship supported by skills and topics. They are the big ideas of the unit.

formative assessment. Provides feedback to the teacher for a better understanding of how to improve or focus instruction.

instructional seminar. Sessions during classroom time for students to learn new information that can be applied during project work.

integrated unit. Focuses on concepts to allow the application of thinking in project work.

performance assessment. A process by which students demonstrate a concept, process, or skill, using whatever means available to them to best illustrate their understanding.

performance task. Activity by which students demonstrate their understanding of a concept.

performances. Demonstrations by students to show their understanding.

processes. Abilities students acquire as they study and learn.

products. Physical evidence produced by students to show their understanding.

project-based instruction. Instructional strategy using real-world application of an integrated unit.

rubric. Scoring tool that shows what a student understands.

skills. A set of abilities needed to perform a particular task. Skills are usually taught in context of a topic.

standard. A level of performance established by specific criteria to which achievement is strived for by all students.

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There are
one-story intellects,
two-story intellects, and three-story
intellects with skylights. All fact collectors, who
have no aim beyond their facts, are one-story men. Two-story men
compare, reason, generalize, using the labors of the fact collectors as
well as their own. Three-story men idealize, imagine,
predict—their best illumination comes from
above, through the skylight.

—Oliver Wendell
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DESIGN TEAMS FOR SCHOOL CHANGE

What skills do you need to use technology effectively in your classroom? Let *Design Teams for School Change: A Cyberprojects Approach* redesign the way you think about technology and how you integrate it into your curriculum.

Design Teams for School Change: A Cyberprojects Approach provides teachers with a blueprint to lead them into the 21st century. This valuable resource guides teachers as they redesign the way they deliver instruction, integrate technological skills, and utilize multiple assessment strategies.

This resource outlines a three-year framework for restructuring the learning environment. First, it describes how to develop a standards-based curriculum that addresses real-world applications. Second, it explains how to deliver project-based instruction using technology. Third, the book describes what skills teachers need to integrate technology into the classroom, how to use technology effectively across the curriculum, and how to use multiple forms of assessment. *Design Teams for School Change: A Cyberprojects Approach* also includes three sample integrated units.

Learn how to incorporate standards, projects, technology, and performance assessment into the daily life of your classroom to ensure real learning is taking place. *Design Teams for School Change: A Cyberprojects Approach* helps you teach lifelong learning skills that help students excel in the cyberage.

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